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THE AMERICAN GAS LIGHT JOURNAL

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[OFFICIAL NOTICE.]

Thirty-Third Annual Meeting, American Gas Light Association.

AMERICAN GAS LIGHT ASSOCIATION,
OFFICE OF THE SECRETARY,
NEW YORK CITY, Sept. 15th, 1905.

There will be an annual meeting of the American Gas Light Association held at Milwaukee, Wis., October 18th, 19th and 20th, 1905. The meeting will be called to order by the President, Mr. E. G. Cowdery, of St. Louis, Mo., at 10 A.M., on Wednesday, October 18th.

The Plankinton and Pfister are both first-class hotels, and because neither can reserve sufficient accomodations for all visiting gas men, it has been thought best to mention neither as headquarters of the Association. The Secretary may be found at either the Pfister Hotel or Meeting Room.

Rates at these hotels as follows:

Plankinton—Will reserve 150 rooms. American plan, without bath, $3 per day and upwards; American plan, with bath, $3.50 per day and upwards. European plan, room without bath, $1.50 per day and upwards; European plan, room with bath, $2 per day and upwards.

Pfister—Will reserve 75 rooms. American plan, without bath, $3.50 per day and upwards; American plan, with bath, $4.50 per day and upwards; European plan, room without bath, $1.50 per day and upwards; European plan, room with bath, $2.50 per day and upwards.

Besides these there are several lower priced hotels: The Republican House, Blatz Hotel, Schliz Hotel, St. Charles Hotel, the Kirby House.

The roll call will be made by means of the door card srstem. Each member, upon entering the hall for the first time, will, at the door, receive a special card, upon which he will find his name, address, etc., as it appears on the Secretary's books, and such card should be corrected and given to the doorkeeper. Members in attendance should attend to this very carefully, as these cards are used immediately after the meeting for correcting the annual membership list. Visitors will please hand to the doorkeeper their personal cards.

A blank form of application for membership accompanies this circular. More can be obtained of the Sectetary.

Remember, all applications must be in the hands of the Secretary by October 9th, at the very latest, otherwise they will not be acted upon at this meeting.

The list of papers to be read at the meeting is as follows:

"Condensation," by Mr. James S. McIlhenny, Washington, D. C.
"Taxation of Gas Companies," by Mr. Geo. McLean, Dubuque, Ia.
"High Pressure Distribution to Date," by Mr. H. L. Rice, Aurora, Ills.
"Methods of Charging for Gas," by Mr. A. E. Forstall, New York.
"Improvements to Date in Consumers' Meters," by Mr. Charles H. Dickey, Baltimore, Md.
"Municipal Ownership," by Mr. B. F. Lyons, St. Louis, Mo.

The meeting on Thursday morning is expected to be opened by a lecture on the "Relativity of Economic Institutions," by Prof. B. H. Meyer, of Wisconsin University.

All members attending the meeting are particularly requested to wear their membership badges in plain sight, thereby greatly aiding the officers and local committee in their work by affording a ready means of recognition.

In order that the year book containing the report of this meeting may be published and issued to the members immediately after the meeting, notice is hereby given that if any of the speakers at this meeting desire to correct their remarks before they are printed, they will be given an opportunity before leaving Milwaukee, but not after. The stenographer will have typewritten copy of the principal discussions prepared at the headquarters between the sessions of the meeting, and all those who desire to correct their remarks must notify the Secretary at the close of the session at which such remarks are made, as all reports will be turned in to the printer immediately after the adjournment of the meeting.

Special rates for transportation hnve beengranted (viz., full fare going and ⅓ returning by the same route) by the several passenger associations named and under the conditions notcd.

The Trunk Line Passenger Association, covering the territory west of New England and east of Niagara Falls, Buffalo and Salamanca, N. Y.; Pittsburgh, Pa.; Bellaire, O.; Wheeling, Parkersburg and Charleston, W. Va.

The New England Passenger Association, covering nearly all the lines in the New England States, with the exception of the Eastern Steamsphip Company.

The Central Passenger Association, covering the territory bounded on the east by Pittsburgh, Salamanca, Buffalo and Toronto; on the north by the line of and including points on the Grand Trunk Railway from Toronto to Port Huron, thence via Lakes Huron and Michigan to the north line of Cook county, Ills.; on the west by the west line of Cook county and the Illinois and Mississippi rivers, to Cairo, including Burlington, Keokuk, Quincy, Hannibal and St. Louis, and on the south by the Ohio river, including points on either side of that river.

The Southeastern Passenger Association, covering the territory south and west of the Virginias and south and east of the Ohio and Mississippi rivers.

The Western Passenger Association, covering the territory of and not including Chicago, Peoria and St. Louis; in other words, the territory west of that of the Central Association and east of Cheyenne, Wyo., including all points in Colorado.

The Southwestern Excursion Bureau, for points in southern Missouri and southeastern Kansas.

The following extracts from the regulations of the railroads are cited for the information of the members. The special rates are granted subject to these regulations:

1. The reduction is conditional on there being an attendance at the meeting of not less than 100 persons holding certificates.

2. Each person to obtain the excursion rate must purchase a first-class ticket (either limited or unlimited) to the place of meeting, for which he will pay regular fare, and upon request the ticket agent will issue a printed certificate of purchase of the standard form. Agents at all important stations are supplied with certificates, but it would be well to inquire of your agent in advance whether or not he has such certificates, so that he can obtain them if not already supplied with them.

3. If through tickets cannot be procured at the starting point, purchase short trip tickets to the most convenient point where such through tickets can be obtained, and there purchase through to place of meeting, requesting a certificate from the ticket agent at the point where each purchase is made. This certificate must be handed in to the Secretary as soon as possible after reaching Milwaukee, to be endorsed by him and the special railroad agent. Under the rule adopted by the passenger associations a charge of 25 cents is made for each certificate indorsed by the railroad agent, so that this sum must accompany each certificate handed in to the Secretary.

4. Tickets for the return journey will be sold by the ticket agent at the place of meeting at ½ the highest limited fare only to those holding certificates signed by the ticket agent at points where through ticket to place of meeting was purchased and countersigned by signature written in ink by the Secretary of the Association, certifying that the holder has been in regular attendance at the meeting, and by the special railroad agent present at the meeting.

5. No reduction of fare will be made on the return passage if the going ticket is purchased more than 3 days before the opening date of the meeting; except that when meetings are held at distant points to which the authorized limit is greater than 3 days, tickets may be purchased before the meeting in accordance with the limits shown in regular tariffs.

6. Certificates are not transferable, and return tickets secured upon certificates are not transferable. The transfer of any such is liable to prevent the securing of reduced rates for future meetings.

7. The certificate of agent at starting point, duly indorsed by the Secretary of the Association and special railroad agent, must be presented to ticket agent at place of meeting within 3 days (Sundays not reckoned) after adjournment of meeting. The return ticket will be for the line or lines covered by the going ticket.

8. No refund of fare will be made on account of any person failing to obtain a certificate.

The committee has under consideration several entertainment features for Wednesday, Thursday and Friday, in most of which the ladies will participate.

Be sure to obtain a railroad certificate when buying your ticket to Milwaukee. The greater the number of certificates handed in the easier it is to get the reduction in rates for future meetings, since the railroad officials count the certificates turned in as marking the full attendance. In our case, the number of certificates is from 50 to 100 less than that of the persons in attendance, and our requests for lower rates are not given the consideration they should receive. Apply for ticket and certificate at least 30 minutes before train time. Each person must sign his own certificate at time of purchasing tickets to Milwaukee. Be sure to hand the Secretary or his clerk your certificates, accompanied by 25 cents for each one, as soon as you reach headquarters. If there are 100 members present holding certificates, each certificate will then be promptly endorsed and handed back to the owner before adjournment. Apply for return tickets at least 30 minutes before train time, and have your certificates with you. All persons, ladies included, attending the meeting are entitled to the reduced rate from the territories named.

Any members having questions which they desire put in the Question Box should send them to the Secretary as soon as possible, in order to give him an opportunity to have them distributed to the members before the meeting, and thus secure for them careful attention.

GEORGE G. RAMSDELL, Secretary.

[NOTICE.]

Thirteenth Annual Meeting of the Michigan Gas Association.

ANN ARBOR, MICH., September 9, 1905.

The thirteenth annual meeting of the Michigan Gas Association will be held at Detroit, Mich., Wednesday, Thursday and Friday, September 20, 21 and 22.

The headquarters of the Association will be at the Russell House, and meetings will be held in a hall a short distance from the hotel.

The following list of papers will be presented:

"Gas Advertising," by Glenn R. Chamberlain, Grand Rapids Gas Light Company, Grand Rapids, Mich.

"Tar Burning in Gas and Electric Plants," by R. A. Field, Superintendent, Rome Gas Electric Light and Power Company, Rome, N. Y.

"Depreciation," by Frank H. Hess, Traverse City Gas Company, Traverse City, Mich.

Report of Committee on "Standard Sizes of Coke and Each Producer's Market Therefore," by Alonzo P. Ewing, Irvin Butterworth, Royal Shacklette, Committee.

"The Removal of Naphthaline from Coal Gas," by Alfred H. White and David H. Cleary.

"Profitable and Unprofitable Consumers," by B. C. Cobb, Saginaw City Gas Company, Saginaw City, Mich.

The Local Committee of Arrangements have planned a theater party for Wednesday evening, a smoker for Thursday evening, and an excursion to the country for dinner on Friday, returning in time for the afternoon trains.

In accordance with a resolution passed at the last meeting, special identification badges will be furnished to all members together with a correspondingly numbered list of members.

The members of the other associations are cordially invited to attend and take part in this meeting.

The Executive Committee meets on the evening preceding the first evening and all who desire to become members are asked to have their applications in by that time. HENRY W. DOUGLAS, Secretary.

[Continued from page 409.]

THIRTEENTH ANNUAL MEETING, PACIFIC COAST GAS ASSOCIATION.

HELD IN MECHANICS INSTITUTE, SAN FRANCISCO, CAL., JULY 18, 19 AND 20, 1905.

SECOND DAY, MORNING SESSION.

The President—The first paper on the programme will be

THE EXPERIENCE DEPARTMENT,

edited by Mr. R. P. Valentine.

The report of the Experience Department for the present year is not an extensive one, but the editor trusts that it will prove of interest to the members of the Association. Verbosity is not always necessary to success. There is no reason why this department should not remain a distinct feature in our programme, and we hope that it will always command the patronage of those that take an active interest in our proceedings. It is the quality of the contributions that counts, but, nevertheless, there should be no hesitancy on the part of the members in the matter of contributing, Our prime purpose is to present valuable facts, edification being a matter of less than secondary consideration. This being the case, we respectfully submit the following concise report:

A Feat in Transportation.—From San Francisco comes the novel description of moving an immense holder by water on a barge. It is needless to say that if this method had been inexpedient, the indomitable gas man would have got there just the same. We were in need of oil storage at our Potrero station, and inasmuch as we had two holders, which were too small for our use at the Equitable works, we decided to move them and convert the lower tanks into oil storage. We found that there was ample thickness to increase the size of the tanks, and, therefore, are figuring on extending same when they are in new position some 12 feet. This will make each tank 25,000 barrels capacity. After a great deal of difficulty with a great many contractors we finally persuaded the present contractors that it was feasible to move tanks over on barges, and Messrs. Blume & Cramm took the contract to move the tanks. After taking out the two lifts, the top, and taking down the frame, poles were erected on the inside over the points where the stringers, which were to be used in lifting the tank, were to be placed. From these poles wires were run to the outside edge of the tank and the tank trussed as it were, so that there would be no bending of the bottom, and so that the side would not get out of place. This transferred most of the weight directly on to the rollers. The tanks were then wedged up as high as convenient and then jacked to about 5 feet above ground. Under these were placed the ordinary timbers used by house movers and rollers. The tanks were then skidded out to the edge of the wharf, which had been braced to carry same, and a barge pulled alongside at high tide, and the tank was moved out on to the barge. Meantime the tide went down and left one corner of the barge supporting the outer corner of the tank—the other side of the tank remaining on the wharf—the tank, however, being shifted far enough ahead to be in a permanent position on the barge. When the tide came up the barge lifted the tank clear of the wharf and was towed out to stream. The method of taking the tank off at Potrero wharf was similar to loading same—the barge being hauled at high tide to a concrete and stone bulkhead, and was hauled off the barge on the second tide after it had arrived there. The matter of moving tanks to the foundation was a simple proposition, and while at this writing the same are not there, it is only a matter of a few days before they will be in permanent position and ready to extend the 12 feet. The total weight of the tank was, approximately, 169,000 pounds. The tanks were 72 feet 6 inches in diameter and 25 feet high, while the barge was 40 feet wide, leaving as you will see quite a projection which was cared for by the trusses in the tank. Appended to this experience I find the following newspaper clipping, which is an example of newspaper exaggeration:

"The unusual sight of seeing a huge gasholder, 75 feet in diameter and 36 feet high, being towed up the bay on a barge, caused much comment along the water front late yesterday afternoon. The great tank looked like a big, black balloon as it slowly moved along, towed by the tug Milton. It loomed up over everything in the harbor as it passed along to its destination at the new gas works at the Potrero. This huge tank, which weighs 150 tons, was originally used at the old Equitable gas works plant at the foot of Hyde street. When this property passed into the hands of the San Francisco Gas Company that corporation decided to dismantle the works. The tank and one similar to it are to be

used as oil tanks for crude oil in the new plant. Blume & Cram, who have the contract for moving the tanks, expect to send the second one to its new home Friday. When this is done the old gas works will be completely dismantled and the Equitable plant will soon be a thing of the past."

Discussion.

Mr. Parker—How did they turn that tank over?

The President—I do not understand that they did. They floated it bottom down on the barge.

Mr. E. C. Jones—I think our friend on the left did not quite understand that it was a steel tank gasholder, and that the gasholder portion of it was removed, and simply the iron tank was to be used as an oil tank.

What was the Trouble?—The following in an example of the many difficulties, sometimes almost inexplicable, that are sure to arise now and then wherever gas is manufactured:

At our works we have two water pumps, one operated by electric power and the other by steam, the steam pump being used when electric power is not available. When the steam pump was installed the suction was increased from 2 to 2½. Not long after the change I was called to the works to find that the electric pump would not give forth any water and when started would hammer and throw the belt. The steam pump was started and pretty nearly tore itself from the foundations. After stopping and starting several times, with the same results, no water and much noise, we concluded that our well had caved or filled with sand. Temporary pipes were run to a neighboring mill, and a supply of water obtained for the works. We then removed the suction pipe, examined the foot valve and sounded the well without finding our trouble. The suction was replaced and the pumps again started and everything worked properly. Once afterward, when running the steam pump, the trouble occurred again, but in a milder form, and after stopping the pump for a little while it worked all right when again started. This occurred several months ago and not since. The only solution we could figure on was that there must be a piece of sack in the well which found its way to the foot valve and then settled back into the well, which is 65 feet deep and the suction 34 feet long. Wonder what really was the trouble?

Experience with Lawn Sprinkler Supply to Scrubbers.—We had been greatly troubled by a lack of efficiency in one of our scrubbers, and naturally turned to the water supply to look for the trouble. The water had been injected through iron disk sprinklers, and upon investigation these were found to be choked and almost filled with shavings, tar and sand. Shortly afterward we experienced similar difficulty with our new scrubber. In this the water had been supplied through cone-shaped spouts, which were closed at the end aud cut with slots. In the first case we cleaned the lawn sprinklers by forcing steam through them. In the second case we did away with the spouts entirely and ran open, vertical pipes to within 16 inches of the grating, allowing the water under ordinary pressure to strike upon pieces of sheet iron, 3 inches square, thus splashing it about. In both instances we connected steam pipes to the water pipes in such a manner as to enable us to shut off the water and turn on the steam whenever advisable. This scheme obviated all possibility of further stoppage.

"Use Gas or Get Off the Street."—Mottoes, epigrams and catchy, suggestive words or phrases are the proper "stunt" in advertising nowadays. Many fortunes have been lost through a failure to advertise wisely; and many men, often undeserving, have become right through the effect of some little word or phrase that they have flaunted before the public. In advertising, the æsthetic or intellectual qualities of style are not to be considered. For instance, here is a company that has adopted the slogan, "Use gas, or get off the street." It can hardly be claimed that the people accepted this imperative statement literally; but the company in question made the remarkable assertion that, through the working out of this bit of poesy the number of stoves, ranges, hot plates and heaters supplied by them has grown to 105 per cent. of the number of meters. There is something for all of you to take under consideration. Scratch your heads; a little thinking, a little originality, and a few words may mean unhoped-for success.

Discussion.

The President—This is a very interesting experience and deals with the all-important question of advertising.

Mr. Leach—In coming over on the train this morning I had a rather peculiar experience. The coal men of this locality have taken a space in the local trains and are filling it with a card containing two cuts One lady has her head bandaged up and just able to get around in the kitchen at a gas stove—the effects of using gas—and at the lower end of the card there is a lady dressed as if she were ready to attend an evening function, and she is sitting on the corner of the the table washing her dishes—she uses coal. It bears this remarkable legend: "Medical experts have declared that the greater portion of ill-health is caused by the use of gas for cooking and heating," and has at the bottom in very large type: "Use coal and save your health." That is the limit.

Mr. Newbert—I am glad to see that the coal men have taken it up along that line, and it will advertise our business. They have stolen our sign.

Mr. Leach—Some of the boys in the car saw me reading the sign and looked over my way and began poking fun at me, and I said: "Gentlemen, we will leave it to the ladies."

How the Trouble was Found.—We have 8 purifying pans connected in series of 4, with a center valve for each set. One of the pans in the set nearest the exhauster commenced blowing, seemingly without cause. On cutting this pan out, the one next to it blew its seal. As our center valve is so constructed that we could cut out one pan at a time, and it being necessary to keep both sets in operation, something had to be done at once, so we sealed the pan that was blowing with dirt packed very hard. We then started up our exhauster when the next pan to the one we had just treated so harshly started to blow. We gave its seal a dose of dirt and again tried to start up our exhauster, when our third and last pan gave us an exhibition of a spray fountain (so familiar to the gas man), and we resorted to the same drastic treatment. We now found ourselves in a condition to force the gas through the purifying pans, but only under a tremendous pressure. In fact, we blew the water out of an 18-inch pressure gauge glass. For the moment we were stumped. That stoppage had to be found, so we tapped the pipe between this set of pans and our distributing holder. This gave us holder pressure, showing conclusively that our trouble could not be between the pans and the holder, and that we must look elsewhere. Our next move was to tap pipe at center valve of our second series of pans, between it and the exhauster, when, to our surprise, we found almost no pressure. This led us to believe that there was a stoppage in the pipe, feeding the second series of pans, and caused practically all the gas to flow through the first series of pans, and in doing so had overtaxed the capacity of the outlet pipes and center valve of this set to such an extent that the pressure was raised to a point higher than the water seal could stand, We now proceeded to tap a 1¼-inch hole in the under side of an elbow near the center valve of the second series of pans and the flow of tar that followed was certainly good to see, as we realized that we had ridden ourselves of a very "objectionable lodger." Our troubles in this respect were over, but we did not rest until we had tapped several holes in the under side of our purifying pan feeders, connected steam pipes, and arranged for handling any that might come our way.

An Experience with Rusty Pipe.—The plain and steel tubing for use in high pressure lines came from the factory last winter on flat cars, and in consequence was badly rusted before it could be gotten under cover. Cleaning machines not being immediately available, a part was cleaned by hand and efficient tools proved a serious problem. Course and fine files were not much of a success because they would not clean out pitted spots and irregularities in the surface of the pipe without removing valuable metal. Emery cloth and sand paper did not last long enough to make a showing. Steel wire casting brushes proved quite efficient, coarse brushes being used to loosen the larger pieces of scale and rust and fine brushes to work into the pits and clean the dust off. Soft red brick, such as would be used only for filling and furnace slag were found excellent, the fine particles working into the pitted spots and irregularities as they broke off. The dust left can best be removed by a fine wire brush, leaving the surface of the pipe clean and bright ready for receiving the paint.

Cleveland Might have Worn this Mantle.—Mr. I. C. Carter, Superintendent of the gas works at Pomona, has a piece of gas apparatus in the parlor of his home which has been in use for 9 years. Considering the destructive qualities of the article itself, this is probably the most remarkable fact in gas history. It is nothing more nor less than a Welsbach mantle which was probably one of the first mantles shipped to this country, and was given to Mr. Carter by a close friend of one of the parties originally interested in the Welsbach patents, to whom it had been sent. The gentleman handed it to Mr. Carter, stating that it had been sent him and he (Mr. Carter) could do what he pleased with it, but that to be very careful of it as it was liable to explode and set fire to the premises, and that it was given him (Mr. Carter) with the

understanding that the giver would not be responsible for any damages which might result from it. This was 9 years ago, and the mantle is still giving forth light. It would seem that the mantles were better made 9 years ago.

An Experience in Oil Gas Making.—It was the day before Christmas. We reached the limit of our capacity at the plant, and knowing the demand during Christmas week for our product would be so great that unless something was done in order to make gas and provide for the emergency that our holders would be touching bottom, and you know what that means in a city where competition is so keen as in this. I have seen you fellows make oil gas in California, and have often thought what a cinch was yours—that all you had to do was to turn on your oil tap, make your gas, sell it, and then sit in an armchair with your feet on the desk and wait for your dividends to come along; but my experience in making oil gas is not so rosy. In order to supply the demand, anticipating the emergency, early in December I ordered 25 barrels of oil from the Union Oil Company, of San Francisco. The emergency arose on December 23d, and we commenced operations. We drilled a hole in the centers of the retort lids of a bench of 6's; having filled a tank holding about 150 gallons of oil, making a nozzle out of a piece of ¼-inch pipe. After the six charges of coal had been cooked we sprayed the oil on the white-hot bed of coke under a pressure of about 60 pounds. The process of injecting the oil lasted about 45 seconds. When all was ready, the foreman, with his hand on the cock supplying the oil, and myself in the exhauster room watching the exhauster, anticipating that the velocity of the new gas would be such as to make the revolution of the exhauster bust something up, I gave the word to turn on the oil. The oil was injected, as I before stated, for about 45 seconds. A plug was put in the aperture and the process repeated in the next retort, and so on until we had treated all six alike. I was aware of the fact that you have a relief holder in which you make your first gas before condensing and purifying, but we took our chances on this. With the exception of a slightly increased rate of speed, the exhauster did not show that it was taking up the gas that was being made, so after the round of the 6 retorts we started again and repeated the operation, but we were not making any gas to speak of, but the oil was certainly being used. Not being able to explain satisfactorily the cause of our non-success, we thought probably the time necessary for injecting the oil was not long enough, so we increased it to 1½ minutes, but with apparently no better result. In a state of great disappointment, bordering on despair, with only 2½ sheets of gas in the holder, I walked around the yard gazing heavenward—probably for inspiration as to what to do—and saw, not our blue northern sky, but an atmosphere of smoke that made me think I was walking the streets of Pittsburgh. Looking at the chimney stack I saw a vast column of smoke emerging, enough to suffocate the town. I then knew that something was wrong in the retorts, as if oil made gas like smoke it should go through the exhauster anyhow, and not through the chimney, and we were burning oil up at the rate of $2.65 per barrel. The foreman informed me that he had selected the oldest bench we had. I had the lids taken off, and looking in the retorts found 4 of them with great big holes which you could put your head into. I felt like putting someone's head into them. Instead of seeing the holder rise triumphant from the ground, what gas was being made was in the form of smoke. It was all going up the stack and the elements were being treated to a taste of oil gas in its natural state. We repeated the trial on a good bench and once again commenced to inject the oil for 45 seconds. You should have seen the exhauster go to work. It was a pleasure and a treat to me, more than any I have experienced during my long years in the profession, with a feeling from almost complete despair to that of triumph in the knowledge that we had emerged from as deep a hole as it was possible for a gas man to be in. The consequence was that not only did we overcome the difficulty we were in, but our consumers stated that Christmas Eve they had better gas than they had ever had. Thank the Lord, we will not have to relate a similar experience through shortage of bench capacity the coming year. It was expensive gas making, but we supplied our consumers with gas all the same. The editor wishes earnestly to thank those that have contributed to this report, and hopes that the success of this department will be more pronounced in future conventions.

The President—Is the Committee on Nominations ready to report?

REPORT OF THE NOMINATING COMMITTEE.

Mr. President and Gentlemen of the Pacific Coast Gas Association—Your Committee appointed to nominate officers for the ensuing year, respectfully report as follows:

President—Mr. J. Martin, San Francisco, Cal.
Vice President—Mr. C. O. G. Miller, San Francisco, Cal.
Secretary-Treasurer—Mr. John A. Britton, San Francisco, Cal.
Directors.—C. R. Collins, Seattle, Wash.; R. H. Sterling, Watsonville, Cal.; W. F. Boardman, San Francisco, Cal.; Herbert C. Brown, Los Angeles, Cal.

Respectfully submitted,

E. C. JONES,
W. B. CLINE,
H. C. KEYES,
} Committee.

The President—Gentlemen, you have heard the report. What is your pleasure?

On motion of Mr. Clement the report was unanimously adopted.

The President—We have the pleasure of having before us our next President.

Mr. Martin—Mr. President and Gentlemen, I cannot say what I would like to. The honor of being President of the Pacific Coast Association is a very great one, and while I do not feel equal to the task, I will do the best I know how and try to approach the great success that my predecessor has met with. I thank you,

The President—We will now have the pleasure of listening to Mr. Martin's paper on

UTILIZATION OF GAS ENGINES IN CONNECTION WITH LONG DISTANCE ELECTRIC TRANSMISSION.

Before proceeding with this paper, I will pass among you some photographs taken of two gas engines used in gas operations, the largest units in the world to-day.

The very rapid progress in the development of electrical machinery and appliances during the past 10 years has invited the capitalist and engineer to instal and operate many hundred thousand horse power, utilizing the waters of the various streams as a source for generating the current. The prime incentive for such development from the inventor's standpoint was the fact that the source of power was being constantly renewed by the laws of nature, and with the authentic records of precipitation as a guide the prudent engineer has recommended a great many plants to be constructed which have proved financially and commercially successful.

The most notable examples of this progress have been and are being developed in the State of California. A great many surprises of a practical nature have been encountered by the managers of those various water power electric developments with particular reference to earning capacity, and more particularly with reference to the relations of "plant utility to plant capacity," commonly termed "load factor." The manager is constantly trying to find ways and means of utilizing the electric current during such times of the day or night when his present consumers do not require it. Numerous plans and devices have been utilized to further this end.

Within the past year the problem was presented to the officers of the California Gas and Electric Corporation, who were desirous of furnishing all the electric current for the operation of the street railroads under the control of the United Railroads of San Francisco, and negotiations were commenced with the officers of the latter company with that end in view. It was very difficult for the railroad people at first to develop even a hope that such a condition of affairs could be made feasible. Here was a company with its thousands of horse power developed at no point nearer than 140 miles from the proposed place of consumption, and while it is true that this company has many sources of supply and many avenues of delivery, yet there was an insurmountable barrier in the minds of the railroad people as to the advisability of purchasing current at any price if the convenience of its patrons was to be sacrificed in any way. As one of the officers of the railroad company remarked: "We certainly desire to save money in the operation of our property, within reason, but at the same time we care more for the goodwill and satisfaction of our patrons, and if any interruption of service should occur on all your lines feeding into the city at one time, we cannot expect our citizens to be patient while sitting in the cars for 1½ hours until you get up steam."

The railroads are operating their steam plant for this service, and the power company suggested the continuance of the operation of these steam plants and receive a portion of the power from the power company, but this plan was not considered advisable.

After numerous interviews, with an honest desire on both sides to try and accomplish the economic result, if it could be done without sacrificing the interests of the patrons of the railroad company, a firm conclusion was reached that in a service so large and important as the carrying of hundreds of thousands of people daily in a large city, nothing could be done on the plans outlined unless some absolute guar-

antee of continuity of service were available, and it certainly was not favorable from the standpoint of the utilization of steam engines for emergency purposes, because if steam were being maintained constantly under the boilers, no economy could result, and if the plants were allowed to cool off the time element of starting would prohibit their use.

The officers of the power company had been making thorough investigations of the development of the gas engine in large units, having sent two of their engineers throughout the entire East to make full and complete reports. In consequence, and as a last resort, the power company agreed to install 3 gas engine electric generating units, each unit having a capacity of 4,000 kilowatts, or a total initial capacity of 12,000 kilowatts. This plant will be enlarged as rapidly as the requirements of the railroad may demand.

The guarantees which have been made by the manufacturers of these engines are particularly interesting. Electric transmission in a position to practically guarantee continuous service, regardless of the length of its transmission lines or the momentary interruptions which do occur through causes beyond human control. It might be fairly stated that the gas engine stands alone as the only means of instantansous generation of electric current at distributing centers in times of emergency at any fair or reasonable cost.

The gas engine electric generating plant of the California Gas and Electric Corporation will also be utilized to a certain extent for the purpose of increasing the load factor of the transmission line, for it is obvious to those familiar with power transmission plants that after proper installations have been made, including full capacity at the hydraulic end, as well as in the power house, and in pole lines, there is absolutely no increased cost for current to the power company, whether its load factor be .2 or .99, and any device which can be utilized to improve the load factor adds that much income and net profit for the power plant. In this particular case the gas engine generating plant was a necessity, for without which the California Gas and Electric Corporation would have been unable to have obtained the contract for power. That being the case, the officers decided to make a virtue out of this necessity, and up to the extent of the cost of fuel being less than the increased value derived from improving the load factor on the power lines, they propose to operate this gas engine plant in that manner and for that purpose.

The gas which will be used to drive these engines will be manufactured from crude oil and will be of the quality similar to the illuminating gas now being distributed throughout the State of California manufactured by this process, ranging from 610 to 660 B.T.U. horse power per cubic foot.

Nearly all of the gas engines in use throughout the East and Europe are utilizing producer gas or blast furnace gases, except in very small units or where natural gas can be obtained, and from investigations which I have made I have ascertained that the largest gas engine using manufactured gas of more than 600 B.T.U. horse power has a rated capacity of 300-horse power, while those in process of installation near San Francisco will in each case be more than 17 times as large.

The nearest approach to these large engines in size are two which are in operation at Hastings, W. Va., each having 4,500-horse power capacity and driven by natural gas, and being used for the compression of natural gas for transmission through a pipe line 200 miles in length. These engines have been and can be started from cold and rest to full load in less than 60 seconds.

The following is a description of these engines: These gas engines are now being built by the Snow Steam Pump Works, of Buffalo, N. Y., and in general design and detail resemble very closely a modern high-grade massive American steam power engine. They are of the horizontal, twin tandem, double acting 4-cycle type, giving two impulses to each crank per revolution.. This is equivalent to a cross compound steam engine. Any cylinder head can be removed from any cylinder by simply disconnecting one jacket water supply pipe and removing the nuts holding the head to the cylinder.

All working parts are above the engine room floor, nothing but water supply, gas, air inlet and exhaust pipes are below the floor, and these are arranged so that they can be trenched. All the main parts have their proper relative positions positively and permanently fixed by male and female centering fits of large diameter, thus practically insuring self alignment.

Lubrication of the cylinders is effected by spreading. This is accomplished by leading four oil feeds, fed by individual oil pumps, to each cylinder, and entering the cylinder at points to successfully effect the proper spreading of the oil. The oil is fed to the cylinder on the inhalation stroke, and is spread on the compression stroke, thus being properly lubricated for the power or impulse stroke. The lubrication of journals is effected by meansof a positive feed lubricator. Each oil feed is carried to the part to be lubricated by means of small tubing leading from a multiple feed oiler containing a small oil pump for each feed led therefrom. The feed to each part is positive and can be adjusted to give a fixed supply of oil per revolution of the engine. When the engine stops the oil feed stops, and when the engine starts the oil feed also starts. Inlet valves, mixers and cut-off valves will be designed so that gasoline can be injected to the surfaces necessary to be cleaned, rendering the dislodgment of any deposit an easy matter without removing the parts.

The pistons are carried by cross heads, thereby materially reducing the weight carried on the bore of the cylinders. By the use of 3 cross heads, the main, intermediate and outboard, proper alignment of the pistons is permissible after years of service, and it is questionable whether an engine without this feature can be regarded as entirely satisfactory.

The question of regulation in the generation of electric current by means of direct connected electrical generators has been a problem not only for the gas engine people but for the steam engine manufacturers to solve, and this has been done in the latter case within the past 2 years practically to the satisfaction of the electrical engineer, so that parallel operation is now successful. The builders of this engine are also following steam practice in this respect, and will be able to keep the angular variation within each revolution at a minimum, satisfactory to the electrical generator manufacturers.

The main shaft will be of the overhung crank type, having the cranks forged with the shaft and with crank pins forced into the cranks. The main connecting rods are simple, plain, with solid adjustable stub ends. The main cross heads are fitted with adjustable babbitted gibs and removable crucible steel wrist pins.

The pistons are designed in such a way that expansion of the faces can take place without affecting in any way the strength or life of the piston. Piston rods extend from the main cross heads clear through the cylinders to the outboard cross heads. and secured to same by nuts. Each cylinder is made in two parts, the joint being circumferential and located half way between the ends.

Separate supply pipes for each individual part to be water jacketed will be furnished, so that the amount of water fed to each part can be regulated, thus permitting the carrying of high temperatures in such parts as cylinder heads, medium temperatures in cylinder jackets, low temperatures to the rods, pistons and metallic packing.

These engines are started by the use of compressed air on storage in compression tanks. Safety devices are provided which carefully control the speed limit.

The dimensions of these engines are very interesting:

Length over all, 70 feet. Width over all of 34 feet.
Weight of heaviest casting, 60 tons.
Diameters of cylinders, 42 inches.
Length of stroke, 60 inches.
Main journals, 30 inches in diameter, 54 inches long.
Main cross head gibs, 27 inches wide, 54 inches long.
Diameter of center of shaft, 38 inches.
Weight of flywheel, 130,000 pounds.
Total weight of engine, flywheel and generator, 1,200,000 pounds.

These engines will probably be in operation on or before January 1, 1906, and from all the investigations which have been made by my co-workers, we are laboring under no doubt as to the absolute success of this installation when completed.

Discussion.

The President—You have heard a most interesting paper that is possibly a little in advance of the times, and I haven't the slightest doubt in the world but what there are a great many questions you would like to ask, which Mr. Martin can answer.

Mr. Rix—I would like to ask what is the revolution speed of those engines.

Mr. Martin—88 per minute.

Mr. Clement—This is indeed a very interesting paper. It is along the lines which we have prophesied for sometime past and about which a great deal has been said. When electricity was first being developed on this coast, we first sought to take the water power, which was the cheapest, apparently in some cases it proved the contrary, and then came to our relief the oil for fuel, and what a convenience that has been to us in our plants, as we have been able to dispose of the services of men, and consequently reduce the expense of the plant, and yet, even with the conveniences of the oil, we have the care, the burden and trouble that arises from it, and all that, and if we have an auxiliary steam plant, the fuel being oil, it takes time to put that plant in opera-

tion, whereas, under this system, a few seconds only is named in which a plant may be put in operation. The value of it cannot be overestimated, and while it may be very practical for some of the larger plants perhaps, yet to my mind it seems that it is practical for smaller units as well, and I would like to-day in the little railroad that I have under my control, to see a gas engine in our power plant, and I would like to ask Mr. Martin if you have an idea of the relative cost per thousand watts, where gas is supplied, and at what price gas could be supplied, and the amount of electricity produced.

Mr. Martin—It would be very difficult for me to give you an intelligent answer on that question for this reason, the very inefficiencies of the various sizes of gas engines, ranging in consumption, we will say, from 14 to 25 cubic feet of gas, would give variations too great to give you any fixed price for your guidance; on the other hand, the inefficiency of a gas engine at varying loads is also another element entering into it, another the cost of the gas, another the load factor, which affects you in a gas engine the same as in anything else; so it is very difficult to enter into the question of costs, those things being entirely local, and for that reason I did not dwell upon the question. The necessity for these, as stated, was the fact that they had to be started quickly. On the other hand, having a plant, the interest and operation of which is charged to the power furnished by the power company, the company will utilize the plant up to the value, whatever it may be, of the fuel, in comparison with the increased earning capacity of the power plant being increased by increasing its load factor.

The President—Mr. Jones, have you not something to say? I believe you are in charge of this work.

Mr. Jones—I do not believe there is anything I can add to what Mr. Martin has said. He has outlined one of the most splendid installations of gas engines that there is in the world, and it is his conception, and as a servant of the Corporation I am trying to carry out the gas end of it and try and make it a success. It was my privilege to visit the East and inspect the different types of gas engines, both American and foreign, the foreign through the help of photographs, drawings and a visit to the Lackawanna steel plant, and it seemed to me that the United States is the proper place to build gas engines. I think we have in this country to-day mechanics who can do better work on gas engines than they can abroad, although in Germany, I may say, they have had a little bit more courage than our Eastern brethren in the construction of large units. That courage may have been a good deal after the kind of courage when a badly scared man is chased by a dog. Courage may be brought about by the scarcity and extremely high price of fuel, which is certainly the case in Europe, where they have and are using large gas engine units; but in California, where we are blessed with crude oil at low prices and of great value, it took a man like Mr. Martin to enter the field and decide that he would take a contract to supply the United Railroads with all the electricity to run their splendid street railway system, and to promise them that their cars should not be kept waiting and that their traffic should not be delayed, and to give an order to the gas engine concerns in the East for engines larger than any they had ever constructed. There is considerable skepticism I find in regard to the introduction of gas engines, and I have faithfully hunted down the source of this skepticism, and its chief source is ignorance. The only way you can find out a thing to-day is to do it. The Eastern gas men have been waiting for some other fellow to do it, and the result is they never will do it. They haven't the courage to place an order for a 5,000-horse power gas engine in the East. Last summer I visited one of the most eminent gas engineers in the world and asked his opinion in regard to gas engines. He said to me: "My boy, I have known you a great many years—I knew your father before you—and I want to tell you something about gas engines. I put in an Otto engine for running an elevator in one of our apartment houses here in town, and one night it broke down just as the people were going down to dinner. I had to take the engine out and apologize to those people for recommending the engine." I asked him whether or not he had ever heard of a steam engine breaking down. He said it was an awful thing to have 1,000 people in an apartment house walking down from the 12th story. Out in California, I said, we put in two engines and two elevators before we think we are safe at all in taking people up and down even 6 stories. After looking over the gas end of the field in the East and talking with people concerning the modern plant and installation, I felt that there wasn't the slightest reason in the world for not recommending gas engines for generating electricity at a very low cost.

The President—Mr. Britton, I believe you are also connected with this enterprise, possibly you can say a few words on it.

The Secretary—I can't add very much to what Mr. Martin and Mr. Jones have said, any more than to further praise that form of grit and go-ahead-ativeness which has given to California—greater things here than any place else in the world. Even nature has taken a hand and produced our Yosemite Valley and other things that startle the world, and this gas engine problem of ours has startled the world. I have never had any doubts since the first investigation was made some 2 years ago, in the matter of the construction and operation of engines of that size, and I think a great deal of the credit of the whole thing is due to the Snow Steam Pump Works, of Buffalo, who were willing to undertake certain guarantees required of them in the specifications for the operation of this plant. And yet, after all, the gas engines themselves, are not all the big things that are going into this plant in Happy Valley, as it was christened by Mr. Jones. You would have to go down there, and you should go down and see what the plant consists of. The place, which was half a marsh and half a vegetable garden, has been transferred into one of the biggest plants in the world to-day, both from the gas producing end of it, and from the gas engine end. You will see gigantic purifiers, holders and massive pipes carrying the gas to the engines, foundations that you cannot even dream of in depth, breadth and solidity. The engines are not there as yet. It is a remarkable thing that it can be undertaken to-day in the face of long distance transmission, to provide a service that will be continuous. I have not a thought in my mind to-day, either from an engineering or practical standpoint, that the gas engines of this type ever will take the place of long distance transmission. I do not believe they can be operated under the conditions of load factor that confronts almost every man who is in the electric light and power business. The purpose for which they are designed and for which they are going to be used, are merely the auxiliary plant to long distance transmission. Protected as the California Gas and Electric Corporation is by eight different plants capable of generating over 50,000-horse power, all being tied in together, or can be and at times are, and protected as we are with double pole lines running to the point of use, there is still the element of uncertainty as has been developed in years, although that is rapidly being overcome here as uncertainty was largely a matter of line insulation—the breaking down of insulators that were supposed to hold up under 50,000 volts, breaking down after time, due to conditions generally climatic around the Bay Shore where we are menaced by the dense salt fogs that prevail day after day, not clearing up at times for 3 or 4 weeks; but through the studies of our engineers in the electric department, we have in use now an insulator that by the most strenuous test has developed will stand up under 60,000 volts, and in this salt foggy belt, has in the last 6 months or more of use demonstrated that at last that that element of danger has been done away with. But little things occur all the time that we cannot provide against. I had a very terse report from one of our managers the other day which illustrated what may happen. It read very much like this. "Cat chased rat up pole, cat killed," but it shut down the transmission line. A long-tailed river rat got in behind the busbars in one of our power houses and disturbed the entire system. Geese and swans and cranes flying up from their resting place at night and spreading their broad wings will touch either wire and cause a short circuit—that has happened. Careless men, and careless boys will throw bailing wires over a wire to see what the effect will be. Now, these things you cannot provide against, and as Mr. Martin has said, the service to the public in traction matters must be positive—it must be continuous. The only way it could be made in this large contract, was by this installation. Storage batteries were out of the question in the matter of cost and also of maintenance, but this does solve the problem and the people of San Francisco can feel that they can travel from one end of it to the other with as much certainty as with steam service. I would impress upon you most in this matter, in your visit to Happy Valley, the gigantic character of it in every detail. I will merely supplement Mr. Martin's statement in reference to the fact that we will have to in our own way take care of the load factor through this plant. We can operate that plant at practically 100 load factor. The load factor of the city of San Francisco is somewhere near 25, not more than that. In the majority of towns it is even less than that, but a load factor of 60 per cent. in a station like ours is a good one, and it is almost impossible to obtain any other. You know, all of you who have had to do with the costs and expenses of the operation of a plant, what it means to increase your load factor from 3 to 8 or 9, and that can de done only in a case of this kind. You could not do it in a small town, as Mr. Clement spoke of, and I think it would be inadvisable to attempt to operate a small plant by gas engines of this character, as all of the factors that Mr. Martin speaks of going into it so largely that you could not begin to form an idea of it. We made the expenditure of

this vast sum of money to put this plant in operation, in order to get this contract, but it does mark an era in the development of electrical engineering that puts California again in the front, and in a year from now, when we meet again, when these engines are running and operating, as I know they will be satisfactorily to everybody concerned, there will have been questions solved not only in the matter of the generation of gas itself to utilize in gas engines, but there will be developed things that we know not of, and will also develop the electric end of it—phenomenon that is new to-day to most people, and the entire staff of the California Gas and Electric Corporation is bending its energies to that development and will, as I said before, put California in the front rank.

Mr. Leach—I would like to ask if this is an auxiliary plant or a regular power plant. I infer from what Mr. Martin says, that it could be started up in 60 seconds, that it was an auxiliary plant.

Mr. Martin—I believe I made that clear in the paper. The plant primarily is an auxiliary emergency plant, but having a necessity for a maximum demand, it will be utilized as a utility plant as well. While I am on my feet, I want to extend an invitation to all of the members of the Association to visit that plant on Friday morning. Mr. E. C. Jones will be there to show you around, and some of his assistants.

The President—I may say in addition, gentlemen, that if a sufficient number of the members would like to go the, Association will arrange means of transportation.

The President—We will now listen to a paper prepared by Mr. Bigelow, of New York city, entitled,

COMMERCIALISM AT GAS ASSOCIATIONS' CONVENTIONS.

Mr. Bigelow is another of the babies in the Association, having joined this season, and I want you to open your hearts and take him in, as only the Pacific Coast gas men can do. He is dealing with a topic that is entirely new in the annals of gas conventions—that of commercialism. He is the publisher of a paper that has recently started to develop the commercial end of the gas business, and he is the father of a new Association organized this year, which will labor also in the commercial fields of the gas business. Mr. Bigelow has come over 3,000 miles to meet with us and read this paper, showing that at any rate he has the faith of his convictions.

Mr. President and Gentlemen of the Pacific Coast Gas Association: I am very glad that my paper comes next to this paper on the gas engine, because of its giving me an opportunity to say that before I left home several important gas men said to me: "You will hear a lot about a very important matter over there—it is the big long-distance transmission and the big gas engines that are going to be installed out there." So you see the East has its eye on the progressive Pacific Coast. There is no question at all but that the East looks upon this end of the country as very much larger and more important than I think possibly some of you gentlemen think they do. You may think that the Eastern men think only of the East. They may say that to you, but in their heart of hearts they think a very great deal of the extreme West. As Mr. Lowe has said, I am a new member in this Association, and it might seem assumption to come here and read a paper just at the time when I am born; but, on the other hand, this is an important subject, and I am very deeply interested in it and in its future.

Though recently I had the honor to become identified with you as a member in this esteemed Association; I could but feel that membership at this time, without attendance, would be too far distant a form of kinship, therefore I have, as Mr. Lowe just stated, crossed a continent with the desire to be accepted as one of you, in true Pacific fellowship.

Our esteemed President, Mr. Lowe, has assigned to me a duty, which as a loyal member, I must essay to perform. It is, so the programme says, to speak upon the subject of commercialism at Gas Associations' conventions.

This topic is indeed an important one, *for is it not so*, that in the commercial or sales promoting side of the industry lies much of its dividend earning capacity?

The gas enterprise of to-day is largely composed of two distinct divisions:

1. The manufacturing, which naturally includes distribution.
2. The selling.

To the first I should say belongs the duty of producing the element, providing holders and piping systems through which to deliver the gas. These are purely engineering propositions.

How shall we dispose of the gas after it is in the holder? That is the question which the commercial or sales division must answer.

For years there have been Gas Associations; they were started when the gas companies confined themselves to the making of gas, coke and tar. These Associations have done much to cultivate skill in the various branches of gas engineering, and to hasten the introduction and use of more modern methods in gas manufacture, as well as the adoption of approved means for delivering the product under high pressures and to long distant points. Thus the original plan and intent of these Associations, so I am told, has been, and is being well fulfilled.

In these latter days the industry is confronted witn an added responsibility, namely, a commercial or sales promoting side. In this connection many gas companies have already assumed the responsibility of becoming merchants, in that they buy and sell ranges burners, mantles, water heaters and other devices and supplies. In some cases this has been done to the extent of creating considerable friction between local hardware, stove and other merchants and the gas company.

Other companies are also energetically doing extensive sales promotive work, but are so conducting their campaigns as to throw the sales into the hands of the local merchants, thus directly co-operating with them for the purposes of harmony and the enlisting of their assistance, and through them the aid of their friends during present and future periods of extensions, etc.

There are other gas companies that are doing neither, seemingly satisfied with what business they can secure without "going after it."

Here are 3 ways now followed and there are doubtless many others. The question arises: How are we to discover them and how are we to judge which of the many is the best method under certain conditions?

Some companies advertise largely in local papers, to gain publicity and favors; some do no (or very little) advertising; others employ a goodly number of solicitors, thus to visit personally every house and shop in the territory. Again, I ask: Which is the best way?

While few plans in toto will work well in all towns or cities, modifications thereof are frequently found both adaptable and profitable. On the other hand, listlessness or apathy on the part of a gas company can never hope to bring it clever results. Such, too, is a retarding element in the enterprise at large and should be dispelled.

There are many commercial methods in vogue here and there with gas companies that if put into active service by others not using them would bring most surprising returns to their coffers. How can we learn of these and other methods, and how may we ascertain more about the results enjoyed by those adopting them? Also, how may we dispel apathy in the fraternity?

These questions lead us directly to the subject before us, and I would suggest as an answer: Let every gas company in the United States that is willing to give and take ideas send a clever commercial representative to such Gas Association conventions, from year to year, as shall present the largest opportunity for consultation, agitation and interchange of ideas, plans and experiences along commercial lines. The stay at-home man, or company, will never prosper, nor help others to the fullest extent.

I have been asked, "Can a gas company afford to send a representative to any considerable distance to attend a convention giving its especial attention to commercial gas matters?"

My response is, "Can any gas company afford *not* to send such a one?" Suppose it should cost a company $100 or $200 or more, to send an "absorbant" (as I might term him) that would return full of ideas which, put into practice, would increase the sales of gas by several thousands of dollars a year; would the investment be a profital one?

Gas companies, as a rule, differ from other merchants in that they have nothing along promotive or sales line to conceal from one another. Herein great virtue lies and exceptional possibilities present themselves. Such being the case, "the other man" is sure to get fully as much as as he gives, sometimes more.

A convention is the place for personal touch. It is a great clearing house for ideas. The very thought, under such conditions, of a company saying "we can't afford to send our man," seems indeed absurd.

Let me ask—Can we get too much commercialism or can we consider and exchange too many sales promotive ideas and plans at a gas convention? I say, "No!" Yet a great difficulty has existed throughout the past in that there have not been hours or sessions enough in the older Association conventions that could be devoted to this commercial side of the industry in order to do it full justice, without seriously pruning down the number and length of the many important engineering subjects that naturally present themselves.

It was the existence of such a condition which led me last November to suggest through the columns of my magazine *Light* that there should be a National Commercial Gas Association, at the meetings of which naught but sales, appliances, business conduct, gas advertising and other similar commercial subjects should be presented or discussed.

The plan recently came to fruition and that Association is to-day in operation, with Mr. Wm. J. Clark, of the Consolidated Gas Company,

of New York city, as its first President. Its first convention will be held in New York next January. Over 50 gas companies (some of the largest in the country) are already represented in its rapidly growing membership. I hope to see most genuine co-operation between the older Associations and this newer one, that has a special work before it in this its especial field. There is, as you see, not even a thought of association competition in its makeup. It is simply the dividing of work whereby to gain largest returns for the gas enterprises of the United States.

There has heretofore in most of the convention programmes been exceedingly little commercialism. This brief treatment of so important a matter cannot hope to bring best results to the industry; while on the other hand, collectively produced and considered at one convention, these various commercial subjects will afford all in attendance a most clever opportunity to absorb a maximum amount of beneficial and sales promotive information.

"In union there is strength."

I have thought that should the old Associations, or certain of them, unite and form one splendid institute of gas engineers, or a national gas engineers' association, which would be a parallel of the American Institute of Mining Engineers, of which type of association there is but one in the United States, that then we should have one Institute of Gas Engineers of the United States, or National Gas Engineers' Association, and one National Commercial Gas Association—and that the meetings of both might be arranged as follows:

Select five days once a year; set apart say the first two of the five for the sessions of the Gas Edgineers' Association, which would be conducted for and by engineers and under its own organization.

Take the last 2 days of the 5 for the convention of the Commercial Association which would be conducted under its own rules and by men representing the commercial side of the industry. Thus you have so organized and officered both of your associations as to secure best results in a most systematic and satisfactory manner.

Professional men prefer to be officered over and controlled by professional men and rules, while business men like commercial control and guidance. It is quite natural.

By this plan you will get the active help and services of not a few very clever men who have till now taken little or no interest in gas association matters. The plan I suggest sets the middle day of the five apart, as a day for social intercourse, excursions, banquets and the like, in which *all*, the engineer, the business man and the appliance or supply man should join.

Note how this would economize in both time and expense. The man desiring to hear only the papers and discussions upon engineering subjects, and enjoy the social functions, would come for the first 3 days and would hear and secure all and only what he came for. He could then, without wasting time, return home.

The business or commercial man, who might wish for only the commercial or sales promoting subjects, could remain in his office at home till just in season for the last 3 days, while the man who might wish to hear all could stay entirely through the 5 days.

In these busy, strenuous days, the man who is purely an engineer, or the exclusively business man, feels in many cases an inability to spare more than just sufficient time to absorb his especial subjects.

This plan would meet all conditions. If the idea suggested were adopted, I can then see a means of having once each year a fine national display of latest equipment, supplies and appliances required in the construction and sales' end of the industry.

A large assembly room could become the scene of a most interesting exhibition that would attract the public during certain hours, thus stirring up that city for gas, and during certain other hours afford the gas men an opportunity to actually see, and have explained to them, many a device which otherwise they would know of only by advertisement, circular, or word of mouth of a traveling representative.

The exhibition of devices, etc., could open with the first of the 5 days and remain open until the close of the fifth.

It should be under the control of the Commercial Gas Association, not of the appliance man, thus to avoid competition for "plums" and the obscuring of the man with lesser "pull" or power among his fellow manufacturers, yet who may have a device that the gas man believes in and which should enjoy equal prominence with the rest.

Every man exhibiting would naturally want the best he could get and he would be apt to crowd his competitor, if the manufacturers controlled the exhibition. So, as I have said, it would be well to have the exhibition each year under the control of the Commercial Gas Association.

You have heard, gentlemen, what my thoughts are upon commercialism at gas associations' conventions.

I believe you can't have too much commercialism, but I also firmly believe that there should be a place for it, when and where it will not crowd the important engineering subjects, or be crowded itself.

I desire to compliment the Pacific Coast Gas Association, of which I am proud to be a member, upon its progressiveness and purpose not to overlook or minimize the commercial side in its consideration of gas subjects. This is displayed by the programme of topics presented at this, its meeting of 1905.

Let me thank you, Mr. President, and you gentlemen, for the many courtesies I am receiving while here with you, and as Secretary of the National Commercial Gas Association let me extend from it, to you, the right hand of fellowship.

Discussion.

The President—It would not hurt the Association if we had a few more babies like Mr. Bigelow. This is the second baby who has this year prepared a paper for the Association. Two of our new members, Mr. Rix and Mr. Bigelow, have favored us and we have had magnificent contributions from each. Mr. Bigelow certainly puts forth some very novel and practical suggestions. The paper is now open for discussion.

Mr. E. C. Jones—Mr. President, I don't like to become an annoyance to the Association, but Mr. Bigelow's paper is certainly a paper in the right line. I can remember 26 years ago, when I joined the American Gas Light Association, at Philadelphia, that the most vital questions discussed were questions relating to the retort house. At that time we were getting about 4.75 feet of gas to the pound of coal, and one man had the temerity to say that he thought he was getting 5 feet to the pound of coal, and he was suspected of departing from the truth. Finally we got 5 feet to the pound, and then it came to tenths of a foot per pound, so that the discussions of the papers of the American Gas Light Association at that time really depended on the work that was being performed, the improvements being made in the gas works proper. In those days the gas superintendent wore a silk hat every day, and was oftentimes mayor of the town and highly respected in his community. The gas superintendent was the whole thing, and it was considered almost a disgrace to suggest to him that he put in something in place of those old iron tips, the sawed iron burners. To-day everything is changed. We are making our gas at a lower cost, and our chief aim is to sell the gas. I was very sorry when the Ohio Gas Light Association took for its badge a full gasholder, a holder way up in the guide frame; but when the Pacific Coast Gas Association sought out something in the way of a badge it selected a circle of pipe, which means a perfect circulation of gas and the flame the ultimate aim of all gas men. A short time ago I had the pleasure of meeting one of the large financiers and owners of gas works in the East, and I said to him: "What do you consider the first requirement of a gas man, and when you are going to employ a man in your business what is the first question you ask him? He said, "Can you sell gas?" We use that as our test. Can we sell gas; how can we make people use our gas and keep them satisfied? We must teach beople the value of gas for different purposes. We know its economy, but we must teach our consumers. In the company which employs me we do that by means of bringing our consumers closer to us by having attractive offices, keeping the offices open evenings and having different kinds of lighting devices, novelties and stoves, and a manager who is affable and who smooths over the rough places, shows the people how to regulate a stove, goes out and regulates a stove for them, and by that means we sell our commodity. We do not want it in our holders. I would rather have a holder 4 rivets out of water and everything at the highest pitch, like an E string in a violin, if the other fellow is only using our gas.

Mr. Bigelow—I just want to tell the gentlemen what I observed in Pueblo. The President of the Gas Company has his store on the Main street. His office is in the store and he has gas ranges and other appliances. He turns that store over to any Church that wants to use it for any kind of social or luncheon, or anything of that kind, on every Saturday night in the year. He showed me his calendar and nearly every Saturday night for several months has been taken. He lets them use the ranges that are coupled up, and provides the gas. He simply turns the place over to them and they come in there and put in their tables and have the luncheon. He gives all the Catholic women and the Presbyterian aud all the Methodist women the use of the room, and so all the women in Pueblo have the use of the store. He never could accomplish that in any other way, I believe. While there, they are, of course, in his mind, and he has these different gas appliances lined up along the sides of the store, so that these people when they are walking around see that the store is full of devices and are becoming

acquainted with them. It is a very inexpensive way and I must say it has been a successful one.

The Secretary—I was about to say that if it hadn't been for commercialism in the Association it would have been a dead one long ago. If it had been purely an engineering organization, with engineer meeting only and reading papers to themselves on abstruse subjects that the others could not understand, it would have been dead. Instead of that, it is a most prosperous organization by reason of its commercialism. It bears more children every year than any other organization I know of; it is fruitful in every way. And we are to blame, as gas men, those of us who were initially gas men, dyed in the wool in the old days Mr. Jones speaks of, when we were only able to get 4.75 or 5 feet of gas to the pound of coal, and when nothing was done to improve the gas business but to drive a consumer away from the office beaause of the extortionate charges made for service connections, for even the setting of a meter and, of course, places where complaints were attended to they were charged for in the bill. Twenty-five years ago, when the electric light became a menace to the gas men, we all remember that the gas men sat supinely down and did nothing, but the men that went into the electric light business went in as business men, they were commercial men, promoters, and they set the old gas men thinking, and when after a while the gas man absorbed the electric light plants, as he did generally all over the country, he was then again the strong power. He knew better how to manage the business, and the association of these industries to-day is history on the Coast, and I think it is true also of the East, that the consolidation of the electric light and gas industries came under the absolute control of the gas men. There are very few to-day of the original electric light promoters that have anything to do with the plants. Now as to the commercial end of it, it generally devolves upon the local manager or president to promote the interests of commerce. You take a man who has to look out for the electric light end of his plant, if it is a generating plant by steam or otherwise, or even a long distance substation, and he has to take care of his gas works and extensions of gas and electric light service all over his district, the care of his office, the care of his consumers, the necessity for being a man around town, a hail fellow well met, who generally joins every society in town, and knows every man, woman and child, and then you expect him to do a lot of commercial work. He can't do it. He has exhausted his abilties. None of them ever become rich, they die poor, they raise large families and all that sort of thing; so it needs something of the spirit of commercialism injected into the spirit of economies that go with gas manufacture. I do not care, so far as I am concerned, in an abstract way, what gas costs per 1,000 in the holder; I think more of what the man does who is at the other end in the way of finding means to sell that gas, and the man who can think most while he is engaged in his daily work, to get rid of the gas, is the man who has the question solved. The aim of the manager of a works, the man who handles the public and the dollars of the company, ought to be, it seems to me, to get more dollars out of the public. Probably they think we are getting enough now. And to-day, I think that there is no better way than that suggested by Mr. Bigelow. So far as we are concerned, the meeting of the National Association would be a detriment to 95 per cent. of our members who could not and would not go beyond the Rockies to get the benefit; yet I think for the general good of the East, it is a magnificent plan, and emphasizes the necessity of taking care of the commercial end of it—the utilization of all of the plans that are gotten up by the active gas men for the sale of gas and the putting them in to service. I do not think the management of any company will ever resist a beneficial action on the part of a manager who will seek by some such means to increase the sales of gas. I do not believe in going out into the wilds and spending your capital indiscriminately to reach outside districts. I think, like charity, it should begin at home, and like the care of the heathen, it should begin south of Market street and not in the South Sea Islands. I think if we take the districts where we are selling gas, there are a thousand and one ways in which they can be enlarged. I have in mind particularly a case of one city when it was taken over by the corporation, and the local manager said every house had been supplied, and that he did not believe any more gas could be sold than was being sold even at a reduced rate. That place, if my memory serves me properly, is selling 10 times the amount of gas it was 3½ years ago, and the extensions of mains have been very slight. It has simply been done by employing ways and means to teach the people to use our commodity, and I trust that the Association that Mr. Bigelow is the Secretary of will grow in strength, and I think it will be a big factor to all of us, and I am certainly heartily in favor of it.

The President—I think that we owe Mr. Bigelow a vote of thanks not alone for this paper, but for his presence. I do not believe he was in the Hall yesterday when I called attention to the fact that, with us it is not customary to thank the writers of papers, but we must not overlook the fact that Mr. Bigelow, has come over 3,000 miles to greet us, and I will be glad, very glad indeed, to hear a motion to the affect that he be tendered a vote of thanks, not for his paper alone, but for the interest he has taken in gas affairs on the Pacific Coast generally, and the Pacific Coast Gas Association particularly.

On motion of Mr. Pederson a vote of thanks was tendered to Mr. Bigelow for his very interesting paper read before the convention.

Mr. Bigelow—This courtesy is very unexpected, and I thank you very much indeed. I only wish that we had the Pacific Coast Gas Association within two or three or even four hundred miles of New York city, so that it could stand right in with the National Commercial Gas Association, which would move 4 times as fast as it can under present conditions.

The President—The time of adjournment is at hand. I wish to call your attention to the fact, gentlemen, that this afternoon will be the last business session of this meeting. We have quite a number of papers that have not yet been reached, and I will ask that you return 15 minutes earlier than usual.

(To be Continued.)

A Modern Sulphate Plant Adapted to a Small Gas Works.[1]

[A paper presented to the Irish Association by Mr. C. B. Outon, of Inchicore.]

It has been suggested to the writer that a detailed description of the sulphate plant erected at the Great Southern and Western Railway works, Inchicore, together with a short account of the objects and method of working, would be acceptable to several members of our Association who have not hitherto treated the ammoniacal liquor produced at their works, and that others who already have stills of one form or another might note some few slight points of divergence in working which, perhaps, would prove of interest to them.

The object aimed at in every form of still is to expel the ammonia, chiefly by the agency of heat; and Lunge's "Treatise" (p. 177) gives a clear indication of the most economical method of heating. In a working experiment, conducted by Dr. Tidy, we are informed that he dealt with 7,000 gallons in each of three trials, with the following results:

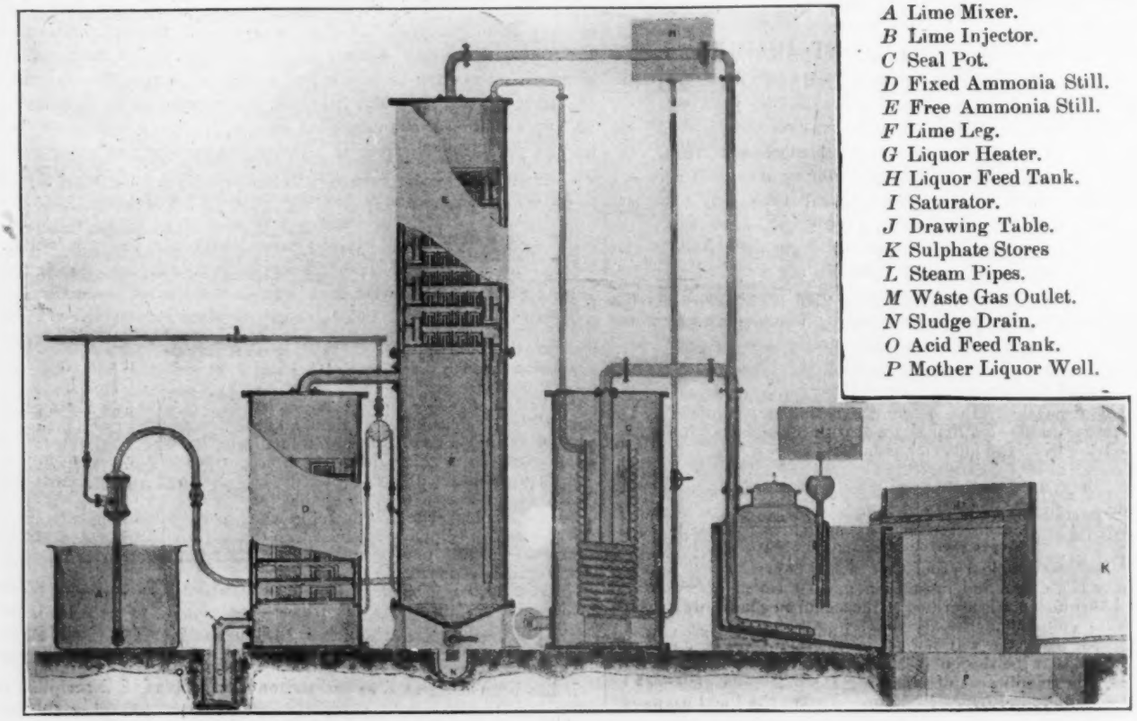
	Duration of Distillation. Hours.	Yield Compared with Theory. Per Cent.
When heated by open fire from without....	22	90.0
" " indirect steam (in a coil)..	18	92.0
" " open (wet) steam.....	14	98.5

This afforded a clear proof that steam blown directly into the liquor was the best and most economical form of working; and its higher efficiency is ascribed to the steam mechanically carrying away the ammonia.

Accordingly, you will notice in the plant to be presently described, that the designers have adopted the third method of heating, for the purpose of obtaining the maximum efficiency in the consumption of fuel. As a portion only of the compounds of ammonia—including the carbonates, sulphides, and cyanide—have their ammonia expelled by prolonged boiling, it is necessary to employ some reagent to decompose the remaining compounds, containing the sulphates, sulphite, carbonate chloride, sulphocyanide, and ferrocynide. Milk of lime is invariably employed for this purpose; and its use increases the yield of ammonia from 15 to 20 per cent., which would otherwise be lost in the effluent liquid.

One of the most important points to be remembered is to aim at the almost complete separation of the tar from the liquor by settling; any introduction of the former into the still giving rise to complications of back pressure produced by the partial decomposition of the tar. We are all aware that liquor, as it flows from the hydraulic main, condensers and scrubber, is charged with tarry particles, some of which are dissolved in the water, while the greater portion are in a state of suspension. These should be separated by settling. In our own case the suction pipe of the force pump which elevates the liquor into the overhead supply tank is capable of being raised or lowered to different levels, to insure its being kept over the zone of the tar level within the the well. This pump is driven off the shaft of our Clapham washer scrubber, and performs the double duty of supplying liquor to the vertical scrubber and also to the supply tank of the sulphate plant.

1. *Journal of Gas Lighting.*



The Sulphate Plant at the Inchicore (Dublin) Gas Works.

Our sulphate house is 26 feet by 19 feet by 16 feet (in height) and is provided with a superheater, free still, lime leg, and fixed still, each of which is 2 feet 6 inches inside diameter and 6 feet high; and also a a saturator, 4 feet by 3 feet by 3 feet. The general plan is shown in sketch, above. It will be observed that provision is made for storing 12 tons of salt, across the width of the house, together with mother liquor and acid tanks, lime mixer, etc.

The supply tank is raised to a height of 3 feet 6 inches over the top of the free still, in order to overcome the pressure of the evolved gases, which are subjected to the seal of the saturator and any back pressure of the purifier. The liquor is first led through a 1½-inch coil of lead pipe within the superheater, and thus absorbs a large proportion of the heat from the saturator outlet gases prior to their final condensation and absorption. The liquor is then conveyed to the free still, shown in section, which is provided with nine trays, each containing nine hoods with serrated edges, and fitted with a 2-inch overflow and mid feathers so arranged as to afford a large amount of travel in each tray.

I have already referred to the introduction of tarry particles with the liquor; and these loose trays form the special feature of this still, as affording an easy and accessible method of removal and re-erection after cleaning, without going to the usual trouble of having to remake the joints of sections of the entire still.

The lowest tray is provided with a 2-inch outlet, reaching almost to the bottom of the lime leg; and into the latter milk of lime is introduced and constantly agitated by means of a steam supply. The liqour then overflows to the fixed still, through the connecting pipe; and the base of this still is also provided with a second steam admission for the completion of distillation. The effluent liquid is then conducted to a water seal, 12 feet in depth, which forms a safe means of insuring that the pressure within the still shall not exceed that afforded by this depth. Accordingly, the fixed leg steam supply has to overcome the sum of the seals of the trays in both the free and fixed stills, the depth of the acid in the saturator, and any back pressure of the purifier. The steam supply to the lime leg is so adjusted that there are equal pressures on both sides of the connecting pipe leading to the fixed still, when the height of the liquid within the lime leg will always be on a level of the connecting pipe. This is indicated by a water gauge column. Both legs are lagged with wood, to reduce undue radiation of heat.

The milk of lime is prepared in a tank in the corner of the sulphate house, and is introduced in a very finely divided state by being allowed to sieve through a sack of coarse mesh. It is forced into the lime leg at intervals by means of a small steam injector.

The gases issuing from the fixed still travel to the base of the free still through the overflow pipe, and unite with those evolved from the free still and are carried, by means of a 2-inch supply, to the saturator. These gases consist principally of ammonia, steam, sulphuretted hydrogen, and carbonic acid; and when the temperature of the saturator exceeds about 200° F. the first is alone absorbed, while the others pass on for condensation and absorption through the waste gas pipe to the superheater and there give up a large proportion of their heat, by raising the temperature of the incoming liquor. A 4-inch outlet from the superheater is then led to a suitable siphon, and through a number of 4-inch pipes, forming a condenser; and, finally, the outlet of the latter is connected to an open oxide of iron purifier. The condenser pipes are sloped, with a fall towards their inlet, instead of towards the outlet. This is done to enable the "devil" water to be removed at a higher temperature, in which state it contains a less percentage of sulphuretted hydrogen than it would do if taken off the outlet. The unpleasant smell of the condensation is thus very largely reduced.

The saturator is made 4 feet by 3 feet by 3 feet, with 1-inch sides and curtain and 1½ inch base—constructed of pure lead. It is provided with an overhead acid supply tank, which is fed by a Regulus metal acid elevator, worked by steam; and so the labor is reduced to a minimum. Provision is also made for a suitable sloping drain, 3 feet 5 inches square by 15 inches deep, lead lined, while the sulphate store, 19 feet by 5 feet 6 inches, is also lined up to a height of 5 feet 6 inches.

I have brought with me an average sample of the salt produced. The salt has been repeatedly tested and found to contain over 25 per cent. of ammonia. Not the slighest difficulty is experienced in its disposal for sale.

Some blue discoloration of the salt occurred occasionally during the earlier working of the plant, which, however, did not detract from its commercial value. The cause has been carefully investigated and found to be due to the acid in the saturator being allowed to become over-neutralized and alkaline. This was followed by the addition of more acid to bring it back to its former state. The ordinary reaction in the manufacture of sulphate, as you are aware, is represented by

$$2NH_3 + H_2SO_4 = (NH_4)_2 SO_4.$$

With these substances in a pure condition, we should have little trouble; but commercial acid invariably contains more or less iron salts in solution as impurities.

The vapors from boiling liquor contain ammonium cyanide, which does not affect the sulphate in the presence of acid solutions, but reacts with sulphuric acid, with liberation of hydrocyanic acid and formation of ammonium sulphate—

$$2H_4CN + H_2SO_4 = (NH_4)_2SO_4 + 2HCN.$$

If, however, the ammonia passes into the saturator until all the acid is neutralized and then becomes alkaline, a reaction immediately takes place between the ammonium cyanide vapors and the iron salts (impurities in the acid) and ammonia ferrocyanide is formed thus—

$$\underset{\text{Ammonium Cyanide.}}{6NH_4CN} + \underset{\text{Ferrous Sulphate}}{FeSO_4} = \underset{\text{Ammonium Ferrocyanide.}}{(NH_4)_4Fe(CN)_6} + \underset{\text{Ammonium Sulphate.}}{(NH_4)_2SO_4}.$$

If more acid (containing iron) be now added, the ammonium ferrocyanide will combine with the iron and form prussian blue; the reaction being represented by—

$$\underset{\text{Ammonium Ferrocyanide.}}{3(NH_4)_4Fe(CN)_6} + \underset{\text{Eerric Sulphate.}}{2Fe_2(SO_4)_3} = \underset{\text{Prussian Blue.}}{Fe_7(CN)_{18}} + \underset{\text{Ammonium Sulphate.}}{6(NH_4)_2SO_4}.$$

The prussian blue remains unchanged by the acid and colors the sulphate; a very small amount being required to tinge a large quantity of sulphate. In order to prevent the formation of blue sulphate, the attendant needs to keep the saturator properly supplied with acid; in other words, he must not allow the ammonia to pass until the acid becomes alkaline. A plug should be fitted on the waste gas pipe leading from the saturator, and the gases tested at intervals with litmus paper. The gravity of the acid should be occasionally sampled, to see that the strength is maintained. As a rule, the blue salt is formed during fishing time, owing to the saturator being then weakest in acid.

In the case of acids containing arsenic, discoloration of the salt also occurs owing to the formation of arsenious sulphide; and I understand that some sulphate makers introduce a small quantity of tar, and also mineral oil, in the saturator for the purpose of accelerating the removal of the arsenious sulphide, and to facilitate the formation of the scum, which can be easily skimmed off, leaving the white sulphate behind.

When sulphate manufacture was first commencee, I should have been greatly assisted by a set of simple instructions for the guidance of the attendant; and accordingly I have prepared a few rules which may prove invaluable to any of you about to start this work.

1. The free and fixed stills are to be first thoroughly heated by turning on both intermediate steam cocks, and the plug on the top of the free still is to be left open until steam freely issues. [The object of this is not to unduly dilute the acid in the saturator by excessive condensation.

2. While this is proceeding, fill the acid and the elevated ammonia water supply tanks. Examine the oxide of iron purifier, and see there is no hard caking against the grids, inattention to which would produce back pressure. Add acid to the saturator until about ⅔ full. The gravity of the mixture must not be less than 75° Twaddel.

3. Next, turn on the liquor supply cock; the proper position being indicated by a pointer on the plug being turned opposite a notch.

4. The level of the liquid in the lime leg should be on a line with the bottom of the pipe connecting it to the fixed still. Should the level get too high, it may be adjusted by partially opening the steam supply cock leading to the "free" still. Should the level get too low, it may be raised by slightly opening the steam supply cock leading to the "fixed" still. [The object of this is to equalize the pressures at the tops of the fixed still and the lime leg, as previously described.]

5. During the manufacture of the salt, the inlet pipe to the saturator should be frequently handled, to detect whether the heat is being maintained. Should the pipe at any time get cool, the liquor supply cock should be at once turned off, and a little more steam turned on to quickly heat it up again. The wooden plug in the supply pipe should be frequently partially opened, to make sure that the ammonia is coming off freely.

6. During the run the gravity of the acid must not fall below 54° Twaddel. [The object of this rule is to prevent the formation of blue salt.]

7. The lime agitator and injector should be worked every quarter of an hour, and a quantity of milk of lime injected.

8. When shutting off, turn off the ammonia liquor supply and the two steam admission cocks half an hour before leaving.

9. Before going away, admit some strong acid to the saturator and remove the wooden plug from the ammonia supply pipe.

The object of the first part of the last rule is to re-dissolve any sulphate which would crystalize out in the cooling of the saturator and tend to clog the holes in the ammonia supply pipe in the saturator, while the removal of the plug prevents the formation of a partial vacuum in the inlet pipe to the saturator, produced by the cooliug of the free still, and thus saves the clogging of this pipe by the sulphate. Everything is then in perfect readiness for the next run.

Coming now to the financial aspect, I have made careful records during the half year ended June 30. I find we have distilled 186 tons of liquor, and used 14 tons 10¾ cwt. of acid at £2 5s. per ton, in the production of 18 tons of sulphate, or a trifle over 16 cwt. of acid per ton of salt. The total cost of the acid was £32 14s. 2d. The labor, including loading into sacks, cost £10 5s. The cost of fuel amounted to £16 4s.; the extra steam being produced by the combustion of 18 tons of coke, which was charged at 18s. per ton. In this respect, we are higher than we should prefer; and this figure might be much reduced by utilizing the small breeze by the aid of a forced blast, which we do not at present possess. Our exhauster and washer scrubber are steam driven, and the fuel charged represents the exact difference required when the sulphate plant was in action. I think perhaps the actual balance sheet for the past half year will afford the best evidence as to the valuabte asset we have in sulphatə making:

To wages making....	£10	5	3	By sulphate (18 tons £12 10s.).....	£215	0	0
" ammoniacal liquor (at 5s. per ton, the price formerly obtained.....	46	7	8				
" coke.....	16	4	0				
" sundries.....	0	11	11				
" lime..... ..	1	7	0				
" acid.....	32	14	2				
" repairs, wages, and materials.	3	12	6				
	£111	2	6				
Profit in half year...	103	17	6				
	£215	0	0		£215	0	0

The profit might be subjected to depreciation of plant and cost of registration free—say, £10 in all; and the difference then shows a very respectable interest on the original outlay.

I would again remind the members that the foregoing remarks have been prompted by a desire to give a few hints to any fellow members who are thinking of distilling their ammoniacal liquor, instead of selling it or allowing it to run to waste. I ought not to forget to add, in conclusion, that the plant just described was erected by Messrs. Biggs, Wall & Company, under the direction of their Assistant, Mr. C. B. Tully.

Mr. Outon, before the discussion was proceeded with, added to the paper the following passage: I have been thinking that I might have mentioned, speaking generally, that, in reference to the saturators, you may notice that I have described my own as being made of 1-inch thickness and 1½-inches base; and I think that these figures should be, as far as possible, adhered to. The thinner sections give rise to repeated leakages, due to uneven expansion and contraction. I have not had sufficient experience in this matter to say—in fact, I feel somewnat diffident in bringing a paper of this nature before you—but I am led to believe that a saturator of the thickness I have mentioned should stand some 15 years. Then with regard to the stills, I have been thinking that even in this, which I consider is one of the most up-to date stills, finality has not been altogether reached, because I notice that no attempt has been made to absorb the heat of the effluent liquid. I think there is a great deal of heat running to waste there. I believe that in large places they utilize this heat in raising that of the feed water to the boiler. The diagram is what I would call a diagrammatic one, inasmuch as it does not actually represent the details, to the effect that for the purpose of illustration, all the parts are brought into one plane. We expected to have had an outside view; but through some mistake it has not been sent here. You will all have observed, however, that it has been illustrated in the advertisement columns of the *Journal of Gas Lighting*.

Tar for Roadways.

The *Gas World* says that at a recent meeting of the Civil Engineers of France, M. G. Forestier, at the request of the Committee of the Association, gave a paper on the present position of the question of the use of tar and other media for coating the surface of highways. M. Forestier is Inspector General of Roads and Bridges in France.

He remarked that mud and dust are the same thing in different aspects, and road engineers have long been trying to cope with them. The idea of using tar goes back to 1871, when an architect of Auch, M. Francou, proposed its use. His idea was to pour it over the road and set it on fire. After that, experiments were made in different places

from 1880 to 1899. In 1896 M. Girardeau, at Luçon (Vendée), observed that where the roadway had been much better heated by the sun the tar applied cold caught much better than it did when the roadway was cool, and this led him to heat his tar before applying it. In 1898, at Los Angeles, Cal., crude petroleum containing 30 per cent. of the local asphalt was used upon dusty roads, and by 1901 about 55 miles of roadway were regularly treated in this manner. In 1900 Rimini used, at Lugo, in Italy, a mixture of tar with a patented dryer. In 1901 experiments were made at Monte Carlo by Dr. Guglielminetti (with a view to diminishing motor car dust), and at Geneva and Nice. In 1902, at the instigation of Dr. Guglielminetti, roads at Champigny, St. Mandé and Vincennes were tarred. The dust disappeared for the summer, and the tar for the most part stood the frost and snow of winter; the cost was about 1.3d. per square yard. At the same time M. Gavrian used crude petroleum and mazout at Versailles. In 1903 the Automobile Association gave financial aid to a test on the large scale on the Saint-Cyr road, some Paris roadways were tarred and large scale tests were made on the departmental road of Seine-et Marne. In 1904 tar was tried in the east of Paris; many of the roadways of the Bois de Boulogne, and in Paris itself about 23,000 square yards of broad roadway, have been tarred. The instance which attracted most public notice was the use of "Westrumite" in connection with the Gordon-Bennet motor race, for which 50 miles were cleared of dust by the use, during 3 or 4 days, of 90 tons of "Westrumite" and 10 times as much water, the staff employed being 100 men. The result was a success, there being no such accidents as those which occurred during the Paris-Madrid race.

The stones of a roadway are, to a small extent, broken by being struck by horses' hoofs and crushed by wheels, but in the main they are disintegrated through rubbing against one another as the wheels pass over them. So long as the roadway is hard, the gangue between the stones do not move and grind against one another; but when the road is very wet or very dry this cohesion fails and the road is readily ground to mud or dust. An intermediate degree of dampness keeps the gangue right; and in order to maintain this condition a waterproof coating would be a good thing to prevent evaporation, or something mixed with the gangue to keep it damp, such as hygroscopic salts or tar or asphaltic products rendered miscible with water by ammoniacal or alkaline salts. "Westrumite" belongs to this latter class of applications; and after the experiments at the Crystal Palace it was used for the eliminatory motor car runs in the Ardennes and afterwards in the Taunus for the Gordon-Bennet race. Other compounds have also been used, known as pulveranto, injectoline, bitumite, rapidite, odoreal and others.

To form an impermeable coating some substance, both effective and cheap enough, had to be found. Heavy petroleum oils are too dear; and coal tar remained. This contains a little ammoniacal liquid and light essences, which favor infiltration into the roadway. It has to be heated, and as it boils at about 176° F., it must be heated on the spot. The roadway has to be carefully brushed so that the tar may sink in and not form a mere superficial crust with the dust; but the brushing must not be driven to the extent of removing the gangue, for it is upon the cohesion of this, not upon the tar, that the stability of the roadway will depend. Several forms of apparatus—scrapers, sprinklers, etc.—have been used for getting a uniform layer of tar deposited; and a day's work is about 1,500 square yards, at about ½ of a gallon of tar per square yard. After the tar has been laid upon the roadway it has to be well brushed in. There is a good deal of difference of opinion among engineers as to what the thickness of the layer of tar upon the roadway should be. It depends a good deal upon the hardness of the stone; with very hard stones less is sufficient than is required with softer stone.

As to results, it has sometimes occurred that the tar has peeled off in flakes under the action of rain or frost; particularly where the ground is spongy or moisture comes up from below. In such cases it must be admitted that tarring serves only to lay the summer's dust and must be renewed each year, as cheaply as may be. In good roadways, however, the rain and frost only partially destroy the tarring, which needs to be only partially renewed from year to year. Tarring makes the roadways greatly more plesant and healthful; and the cost is from 31 cents to 41 cents per square yard, taking tar at $10 per ton. Tarring certainly reduces the cost of maintaince. For example, a road which had to be done every 3 or 4 years, at a cost of about 50 cents per square yard, looks as if it will only have to be done once every 5 or 6 years—a difference which will more than pay the cost of tarring once every year.

M. Forestier does not believe in mixing schist and asphalt to form a gangue between the stones of the roadway; the surface is too mobile.

In the discussion which followed the paper, M. P. Mallet asked about the use, without heating, of a mixture of coal tar and heavy coal tar oils. The Professional Syndicate of the Gas Industry in France, he said, had been promoting experiments which had been carried out at Versailles, under M. Le Gavrian, in which, beginning with 10 to 15 per cent. of coal tar oil, it had been found that 7½ per cent was amply sufficient, the mixture being then fluid, even at 59° F., and being very easily applied. The depth to which it penetrates is about 1.2 inch instead of 0.8 to 1 inch as with tar alone; and the surfac of the roadway then has a certain elasticity which favors its durability, and the microbe destroying power of the mixture used is decidedly advantageous. M. Forestier said time would show, but he rather feared that the addition of coal tar oil might prove too expensive. M. Mallet pointed out that even if it cost, $20 a ton, that would only make the tar mixture cost $10.75 instead of $10 a ton for tar, and less of it would do; so there was no fear under that head.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

SUFFICIENT is now known of the details of the meeting of the American Gas Light Association in Milwaukee, Oct. 18th, 19th and 20th, to show that it will be an unusually profitable and interesting meeting. The subjects of the papers are uncommonly well chosen and upon particularly timely subjects. The papers with the discussions sure to follow will prove an attraction that should draw out a very large attendance of the present members and also attract a very large number of applicants for membership, Low railroad fares—a very favorable location—a well chosen programme, all combine to amply repay all who attend.

THE Gas Machinery Company has obtained a contract for the installation of a double superheater water gas apparatus of a capacity of 250,000 cubic feet per day, also the necessary purifiers, washer, meter, exhauster, etc., from the Gas Company at Bloomington, Ind.

NOTHING is doing yet among the Democrats for candidate for governor of Massachusetts, but Josiah Quincy says that they are not suffering for want of suitable material, and that by the time the convention meets a candidate will be produced. Gen. Morris Schaff, on the gas and electric light commission, will probably be a candidate, if the campaign could be run on a platform of true Democracy.

THE State board of gas and electric light commissioners recently received notice from the Charlestown (Mass.) Gas and Electric Company that it would not reduce the price of gas from $1 to 90 cents per 1,000 cubic feet, as recommended by the board. The Company complains that it will be unable to comply, because of extensive improvements it contemplates. The recommendation was to have gone into effect September 1. Under the laws the Commissioners may call upon the Attorney-General to make a reduction in the price of gas if they decide the Company's objections are not justifiable.

MR. S. J. FOWLER, General Manager of the Charlestown (Mass.) Gas Company, in discussing the action of his Company in asking the Gas Commission to reconsider its action in ordering the reduction of price to consumers to 90 cents per 1,000, said: "Let it be understood from the first that my Company has not refused to do anything. The Gas Commission sent the Company a letter asking them to reduce the price of gas to 90 cents per 1,000. It is not fair of the commission to ask us, a small Company, doing only one-seventeenth the business which the Consolidated is doing, to sell gas at a lower rate than they are. There are to-day only 2 gas companies east of the Alleghanies which are selling gas at 90 cents." Charlestown had been instructed to make a price of 90 cents per 1,000 cubic feet on September 1st, which was not done.

MESSRS. J. T. LYNN and Emanuel T. Berger, two Detroit capitalists who were interested in the recent purchase of the Union Gas and Electric Company, of Bloomington, Ills., have completed the transfer papers and held a meeting for organization. The following officers were elected: President, J. T. Lynn, of Detroit; Vice-President and Treasurer, A. E. Nusbaum, of Chicago; Secretary, E. T. Berger, Detroit; Directors, John T. Willard and J. O. Wilson. The organization of the new Company indicates that the concern is largely controlled by foreign capital, though there is some stock held in Bloomington. The

management of the physical property will be still in the superintendency of Mr. Berkley, who has for some months been the Superintendent. The new financial managers announced their intention to make important and costly improvements in the plant, including the relaying of piping and the equipment of the plant in an up-to-date style.

DEFYING the District Court injunction, the majority members of the City Council of Omaha, Neb., attempted to pass the ordinance unconditionally extending the Omaha Gas Company's street lighting contract. President Zimman refused to entertain the motion for a third reading, and the City Clerk was persuaded by the mrjority to ignore the rulings of the Chair and call the roll on the passage of the ordinance. This received a majority vote. After adjournment it was discovered that the ordinance had never been read a third time, and consequently the vote had no effect. Subsequently a proposition was received from the Cleveland Street Lighting Company offering dollar gas to consumers and cheaper street lighting if granted a franchise.

OLDTOWN, Me., will have gas piped from Bangor soon.

THE people of Spencer, Mass., object to the present pollution of the water used in the mills. Alfred Clark will handle that proposition in his usual successful manner.

THE people of Quincy, Mass., complain of high price and inefficient service. We understand that no extensions have been made there in 15 years. They threaten to franchise another company if something is not done.

THE Goshen (N. Y.) Gas and Fuel Company and all the property and assets of the same, consisting of a plot of land on the westerly side of Main street, Goshen, 150 feet in front and rear, and 125 feet in depth on each side, together with the buildings and improvements thereon erected, and the gasholders, oil tanks, street mains, gas meters, merchandise on hand and other property in the inventory described, together with the goodwill and all the corporate rights and franchises of the Company were sold at auction, at the Company's plant on September 5th. The property was sold in bulk subject to a mortgage of $30,000 held by the Orange County Trust and Safe Deposit Company. There were 3 bids upon it. The property was struck down to James Gamble for $30,020. The sale was held pursuant to an order of the Supreme Court granted upon the application of Benjamin J. MacDonald and Graham Witschief for the voluntary dissolution of the Company. As soon as the Company passes into the control of Mr. Gamble, a number of improvements will be made, new and modern machinery will be installed and the plant placed in first-class condition. The capacity of the plant will be raised to 250,000 cubic feet per day, and a new holder installed.

THE Owensboro (Ky.) Gas Light Company has changed hands. The new owners are Chicago business men, who now have full charge. The majority of the stock of the Owensboro Gas Light Company was controlled by the Wymans, of Louisville, and the Fitchs, of Bowling Green. The work of reconstruction is now in progress. A new tank will be constructed having a capacity of 100,000 feet of gas.

MARYVILLE, MO., city officials are looking up the gas industry, not to build a municipal plant, however, but to be prepared to submit propositions to investors for the construction of a plant there.

MR. FREDERICK E. GUNNISON, chairman of the newly organized New York State commission on gas and electricity, recently visited Boston, where he made a study of the procedure of the Massachusetts commission, on which the New York State commission is modelled. He found that in Massachusetts the commission was paid by a special assessment on the companies, while the New York commission expenses are to be paid out of the State treasury.

BROWNWOOD, Tex , is looking for investors to build it a gas plant. Smaller towns than Brownwood have successfully operated gas plants.

EX-COUNCILMAN JOHN STEGAR, of Philadelphia, of the Vare brothers' section of the city, committed suicide with a pistol. Stegar was for the gas lease, suffered under the boycott, and finally was given a place in the Recorder of Deeds office, of which William Vare is the head.

AS a result of some very clever work on the part of Mr. C. M. Thomas, General Manager of the New York and Queens Gas Company, of Flushing, L. I., and the co-operation of his assistants, over 100 of the Bayside people have subscribed for gas, and the work of supplying them goes ahead immediately. The 100 subscribers was the *sine qua non* of the transaction.

THE lamplighters of Bostom have formed a union. Next!

THE Union Depot Company has bought from the Denver (Col.) Gas and Electric Company the plant and ground of the latter Company, close to the depot grounds, north from 18th and 19th streets. The price paid is $250,000. Almost a block of ground is contained in the sale. A corner cut-off is used by the Colorado and Southern track. The Depot Company needs the ground The plant is used for making Pintsch gas, and the Denver Gas and Electric Company has the patent for Denver. A new plant will be built as quickly as possible by the Gas Company, probably near to the other plant on the west side.

JOHN E. COTTON, a member of the special commission appointed to consider and report as to the advisability of applying the English sliding scale system to the price of gas and gas dividends in Boston, has returned from London. The other members of the commission sailed for Boston on the 14th inst. Mr. Cotton said that the commission had carefully gone over the ground and studied the situation as it existed on the other side, but no report will be made until the return of the commissioners.

A GAS plant is to be established in Avondale, Md., to supply gas for lighting, fuel and power purposes in that borough aud surrounding neighborhood. The cost of the plant will be about $45,000.

JUDGE F. E. BAKER, of the United States Court of Appeals, has filed a supplementary opinion in the case broughtby Byron Quimby, of Massachusetts, to enjoin the city of Indianapolis, Ind., from exercising its option to purchase the plant of the Consumers Gas Combine Company. About a month ago Judge Baker held that the Gas Company, under its charter, had no authority to give the city an option, and at that time his opinion was heralded throughout the country as a distinct blow to the theory of municipal ownership of public utilities. It was stated here by members of the city administration that the decision would impair the city's options on other public corporations and an appeal was taken to a higher court. His supplementary opinion not only reaffirms the first one, but goes a step further and declares that the city had no right under its charter to operate a natural gas plant. Judge Baker holds that when the city charter was framed natural gas was unknown, hence there was no provision in it for the city to acquire and operate a gas plant. As to municipal ownership, Judge Baker says it is a question for the political department of the State to deal with. If cities have not the power they desire in the line of municipal ownership, they cannot create it by contract or ordinance, but must go to the Legislature for it. In conclusion he said: "To what extent municipal ownership shall be carried is a political question to be answered by the political department of the State. Municipalities have only such powers as the State confers upon them. Their charters are given and are taken away by the Legislature. If cities have not the power they desire in the ownership of public utilities, they cannot create them by ordinance or contract; they must go to the Legislature."

THE improvements at the plant of the Monmouth (Ills.) Gas and Electric Company have been making rapid progress. While it will be some time before the actual manufacture of coal gas instead of water gas can be commenced, yet the present condition of the work gives assurance that no stone will be left unturned to put splendid service into operation in this city. The work is under the personal supervision of engineer T. W. Odell.

MESSRS. THOMAS H. SPANN, W. D. Cooper, L. B. Swift, T. L. Sullivan and G. C. Tanner have been appointed trustees for life of the stock of the Citizens Gas Company, Indianapolis, Ind., which is now being organized to furnish gas at 60 cents per 1,000 feet. F. D. Stalnaker, Franklin Vonnegut, Albert E. Metzger, C. H. Badger, Henry Kahn, James L. Keach, E. H. Eldridge, Lorenz Schmidt and A. F. Potts were elected the first board of Directors. George J. Marott, who subscribed for $100,000 worth of stock, refused to become a trustee or director. The Company will be incorporated within a few days with a capital stock of $1,000,000. It is the outgrowth of a public movement for cheaper fuel gas. The Company has received a report from C. C. Brown and B. J. T. Jeup, consulting engineers, stating that gas can be profitably manufactured at 60 cents per 1,000 feet. Many local capitalists have signified their intention of taking stock.

THE AMERICAN GAS LIGHT JOURNAL

A. M. CALLENDER & CO.,
PROPRIETORS.

THOS. J. CUNNINGHAM,
ELBERT P. CALLENDER,
EDITORS.

CHAS. E. SANDERSON,
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WESTERN GAS ASSOCIATION.
OHIO GAS LIGHT ASSOCIATION.

NOTIFICATION RESPECTING ADVERTISING.

Orders for new advertising, or for changes in standing advertisements, to insure attention in the issue following their reception, must be in hand any time of Wednesday.

AGENTS:

New York—American News Co., 39 and 41 Chambers St.
Germany—Lemcke & Buechner, of New York.
England—Aug. Siegle, 30 Lime Street, London.

MONDAY, SEPTEMBER 18, 1905.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks,

16 WALL STREET, NEW YORK CITY.

SEPTEMBER 18.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share.

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked.*
Consolidated	$73,177,000	100	183	..
Central Union, Bonds, 5's	3,000,000	1,000	108	110
Equitable Bonds, 6's	1,000,000	1,000	..	102
" 1st Con. 5's	2,300,000	1 000	118	120
Mutual	3,500,000	100	275	290
Municipal Bonds	750,000	..	..	..
New Amsterdam Gas Co. .. Bonds, 5's	11,000,000	1,000	111	114
New York & Richmond Gas Co. (Staten Island)	1,500,000	100	37	43
1st Mtg. Gold Bds. 5 p. ct.	1,000,000	..	98	104
Northern Union, Bonds, 5's.	1,250,000	1,000	105	107
New York and East River.. Bonds 1st 5's	3,500,000	1,000	112	114
" 1st Con. 5's	1,500,000	..	106¼	108¼
Standard	5,000,000	100	140	160
Preferred	5,000,000	100	155	175
Bonds, 1st Mortgage, 5's	1,500,000	1,000	111	114
Yonkers	299,650	500	130	..
Out-of-Town Companies.				
Brooklyn Union	15,000,000	100	180	190
" " Bonds (5's)	15 000,000	1,000	113	115
Bay State	50,000,000	50	3/16	¼
" ncome Bonds	2,000,000	1,000	..	75
Binghamton Gas Works	450,000	100	..	65
" 1st Mtg. 5's	509,000	1,000	95	100
Boston United Gas Co.— 1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000,000	1,000	47½	50
Buffalo City Gas Co.	5,500,000	100	6	7
" " Bonds, 5's	5,250,000	1,000	75	80
Capital, Sacramento	500,000	50	..	35
Bonds (6's)	150,000	1,000	..	..
Chicago Gas Co. Guaranteed Gold Bonds	7,650,000	1,000	104	104¼
Cincinnati Gas and Electric Co	29,500,000	100	106⅝	106⅞
Columbus (O.) Gas Co., 1st Mortgage Bonds	1,500,000	1,000	90	..
Columbus (O.) Gas Lt. & Heating Co	1,682,750	100	..	95
Preferred	3,026,500	100	107¼	108
Consumers, Toronto	,000,000	50	200	204
Consolidated, Baltimore	11,000,000	100	85½	87
Mortgage, 6's	3,600,000	..	..	118
Chesapeake, 1st 6's	1,000,000	..	..	..
Equitable, 1st 6's	910,000	..	..	..
Consolidated, 1st 5's	1,490 000	..	..	112
Consolidated Gas Co. of N.J.	1,000,000	100	15	17
" Con. Mtg. 5's	880,000	1,000	92	95
Bonds	75,000	..	..	100
Detroit City Gas Co	4,835,500	50	..	50
" Prior Lien 5's	5,603,000	1,000	..	96
Detroit Gas Co., 5's	381,000	1,000	75	80
" Inc. 5's	16,000	100	98½	100
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	..	101
Essex and Hudson Gas Co.	6,500,000	..	39	40
Fort Wayne	2,000,000	..	..	..
" Bonds	2,000,000	..	55	..
Grand Rapids Gas Lt. Co. 1st Mtg. 5's	1,225,000	1,000	104½	105
Hartford	750,000	25	190	200
Hudson County Gas Co., of New Jersey	10,500,000	..	110	112
" Bonds, 5's	10,500,000	..	110	110½
Indianapolis	2,000,000	..	60	70
" Bonds, 5's	2,650,000	..	104½	105
Jackson Gas Co	250,000	50	82	..
" 1st Mtg. 5's	290,000	1,000	97	100
Kansas City Gas Light Co., of Missouri	5,000,000	100	..	36
Bonds, 1st 5's	3,822,000	1,000	102	104
Laclede, St. Louis	10,000,000	100	-	
Preferred	2,500,000	100	95	110
Bonds	10,000,000	1,000	108½	109
Lafayette Gas Co., Ind	1,000,000	100	..	60
Bonds	1,000,004	1,000	60	65
Louisville	2,570,000	50	143	145
Madison Gas & Elec. Co. " 1st Mtg. 6's	350,000	1,000	106	108¾
" 6 per cent. scrip, due 1910	100,000	25	85	87
Montreal, Canada	2,000,000	100	218	218¾
Nashville Gas Lt. Co	1,000,000	100	110	..
Newark, N. J., Con. Gas Co.	6,000,000	..	56	58
Bonds, 6's	4,600,000	..	137	138
New Haven	2,000,000	25	200	..
Peoples G. L. & Coke Co., of Chicago	25,000,000	100	103	103½
Peoples Gas Lt. & Coke Co., Chicago, 1st Mortgage	20,100,000	1,000	..	..
2d "	2,500,000	1,000	104	..
Rochester Gas & Elec. Co..	2,150,000	50	88	..
Preferred	2,150,000	50	118	..
Consolidated 5's	2,000,000	..	104½	105½
San Francisco, Cal.	15,800,000	100	58½	58¾
St. Joseph Gas Co. " 1st Mtg. 5's	751,000	1,000	92	..
St. Paul Gas Light Co	1,500,000	100	45	47
1st Mortgage 6's	650,000	1,000	113	116
Extension, 6's	600,000	1,000	112½	115
General Mortgage, 5's	2,465,000	1,000	96¼	..
Syracuse, N. Y.	1,975,000	100	50	55
Bonds	2,047 000	1,000	102	..
Washington, D. C	2,600,000	20	313⅛	315
First mortgage 6's	600,000	..	..	..
Western, Milwaukee	4,000,000	..	..	..
Wilmington, Del	600.000	50	220	..

DIVIDEND NOTICE.

OFFICE OF THE UNITED GAS IMPROVEMENT CO., N. W. CORNER BROAD AND ARCH STS., PHILADELPHIA, PA., Sept. 13, 1905.

The Directors have this day declared a quarterly dividend of 2 per cent. (one dollar per share), payable Oct. 14th, 1905, to stockholders of record at the close of business, September 30, 1905. Checks will be mailed.

1580-4 LEWIS LILLIE, Treasurer.

Position Wanted
As Superintendent or Manager,

By a man who is a mechanic and has advanced himself through hard work and study from the works to the management. Excellent record. Fifteen years' experience. Address, "STOKER,"

1581-1 Care this Journal.

Position Wanted
AS GAS MAKER,

Operator of modern apparatus in large works, or would accept a position as working superintendent in a small plant. Familiar with the distribution end.

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MANAGER OF A GAS COMPANY,

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1579-2 Address, "F. L. F.," care this Journal.

WANTED,
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Good situation for a competent, energetic young man. Address, giving age and experience, "CENTRAL,"

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WANTED,

A WORKS' FOREMAN, one thoroughly competent and versed in coal gas making, and who understands the operation of a 5-foot water gas apparatus. One who unders ands working men and can show results. Foreman is to be held responsible for entire operation of the works only, and to be able to make satisfactory reports. City of 6,000 people. Salary $1,000 per year. Address, "FOREMAN,"

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WANTED,
GAS RANGE SALESMAN,

To handle line of established ranges. One who is thoroughly acquainted with gas range business in the following territory: States of New York, New Jersey, Pennsylvania, Delaware, Maryland and Virginia. Address, "M. A. W.,"

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WANTED,
A SECOND-HAND 8, 10, 12 OR 15 ACTUAL HORSE POWER OTTO GAS ENGINE.

Address, . . . "C. G. P.,"

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WANTED,
A Lowe, Jr., Set of Water Gas Apparatus.

Must be in first-class condition. Also, 6 by 8 purifying boxes, with 24-inch seal.

1578 3 Address, "M.," care this Journal.

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I wish to buy controlling interest in gas company on investment basis.

Address, "B. G,"

1580-2 Care this Journal.

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Non-Contact 2	$35.00	¾ Inch.	2½	34⅝ Inches.	12 Inches.	70 Pounds.
" 1	30.00	¾ "	2	31 "	10¾ "	62 "
Contact 6	25.00	¾ "	3	29½ "	12 "	60 "
" 8	20.00	½ "	2½	28½ "	10¼ "	48 "
" 9	17.00	⅜ "	1	24 "	9¾ "	45 "

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Newbigging's Handbook for Gas Engineers and Managers.

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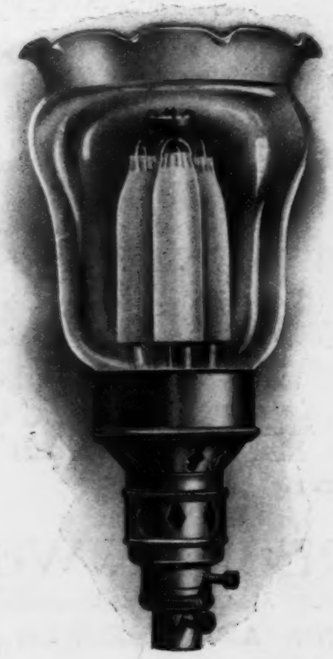

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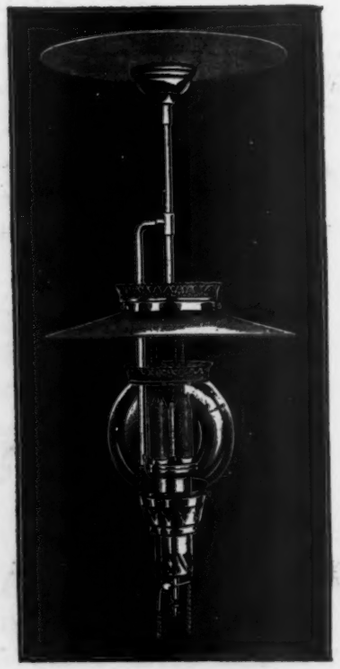


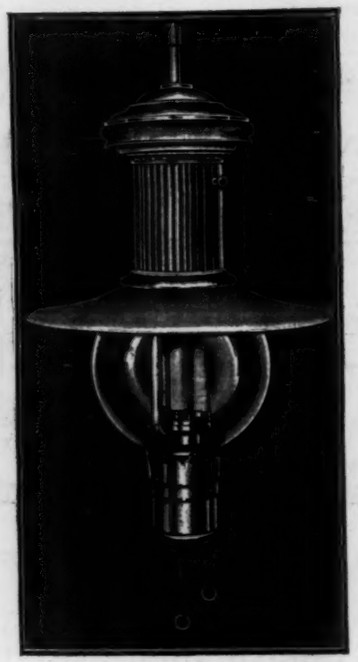
DOORENBOS ARC No. 1.
BEST IN THE WORLD.

Suppose we should say, we can construct an incandescent gas burner to give 25 per cent. more light on the same gas consumption than any other burner now on the market. Would you not say this is good and I should like to have some?

Suppose we could further say we can maintain this increased efficiency, and further, eliminate all screens, cups or gauzes, using simply an open bunsen of heavy gauge tubing, which will last for years. Would you not readily agree that this would be good and materially decrease your maintenance cost?

Then suppose we say we can use a very small mantle, 3 inches long by ½ inch diameter, instead of 3½ inches long by 1¼ inches diameter, would you not concede that the smaller mantle, if of equal quality, would last longer?

Then suppose we say we can do all this absolutely, beyond any question of a doubt, and add to these all practical features the novelty of a multiple of small mantles, four in number, and so construct the burner that a small pilot will light these mantles by simply turning the burner, and that you can light 1, 2, 3 or 4 of these mantles at will, thus having just the amount of light you may require at your pleasure and at a minimum cost, all of this in a burner that can adorn the handsomest gas fixture, can be put up by anyone, has absolute control of the delivery of gas and mixture of air, so that it can be readily adjusted to any gas. What would you say?



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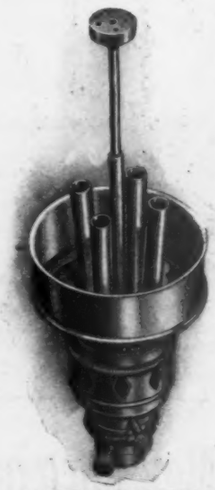

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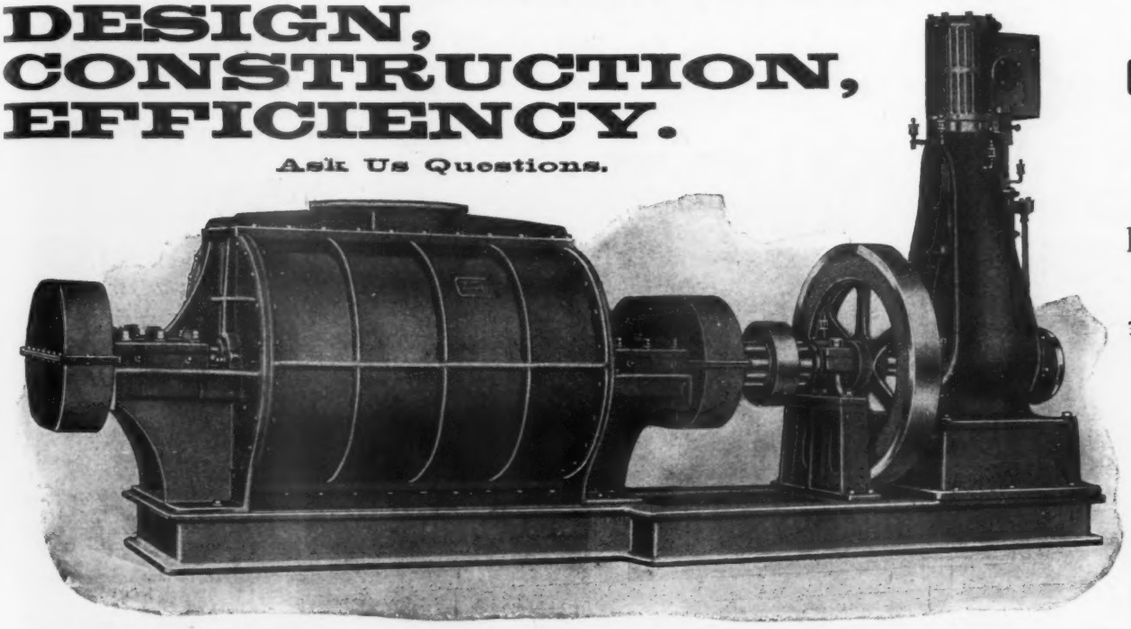

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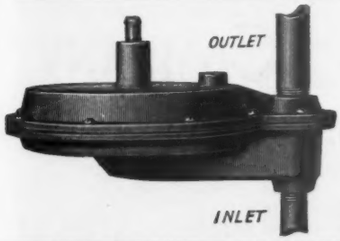

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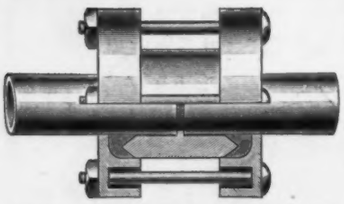
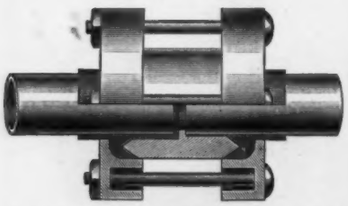
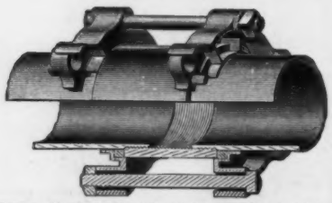


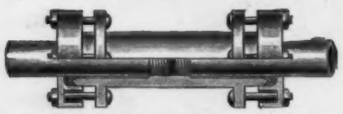
Regular Coupling, Style 1, for Plain End Wrought Iron Pipe.



Insulating Coupling, Style 5, for Plain End Wrought Iron Pipe.



Clamp, Style 4, for Repairing Leaks on Screw Collar.



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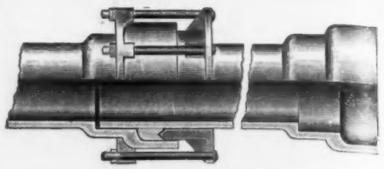
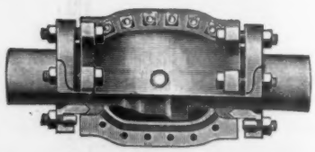
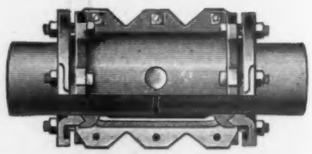


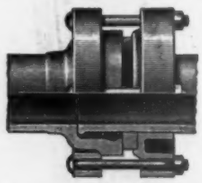
Coupling, Style 9, for Special Style Cast Iron Pipe.



Split Sleeve for Repairing Broken Bell on Cast Iron Pipe.



Split Sleeve for Repairing Broken or Cracked Cast Iron Pipe.



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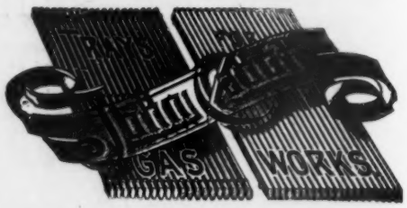

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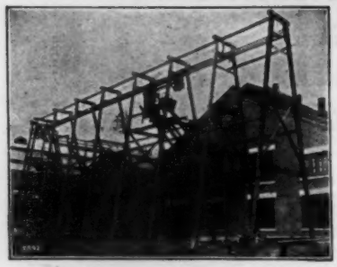

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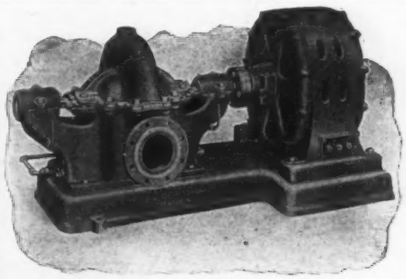

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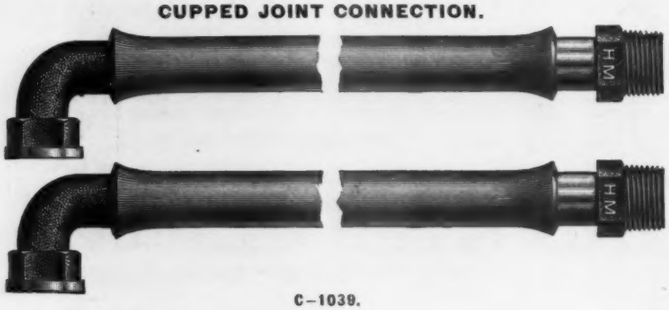

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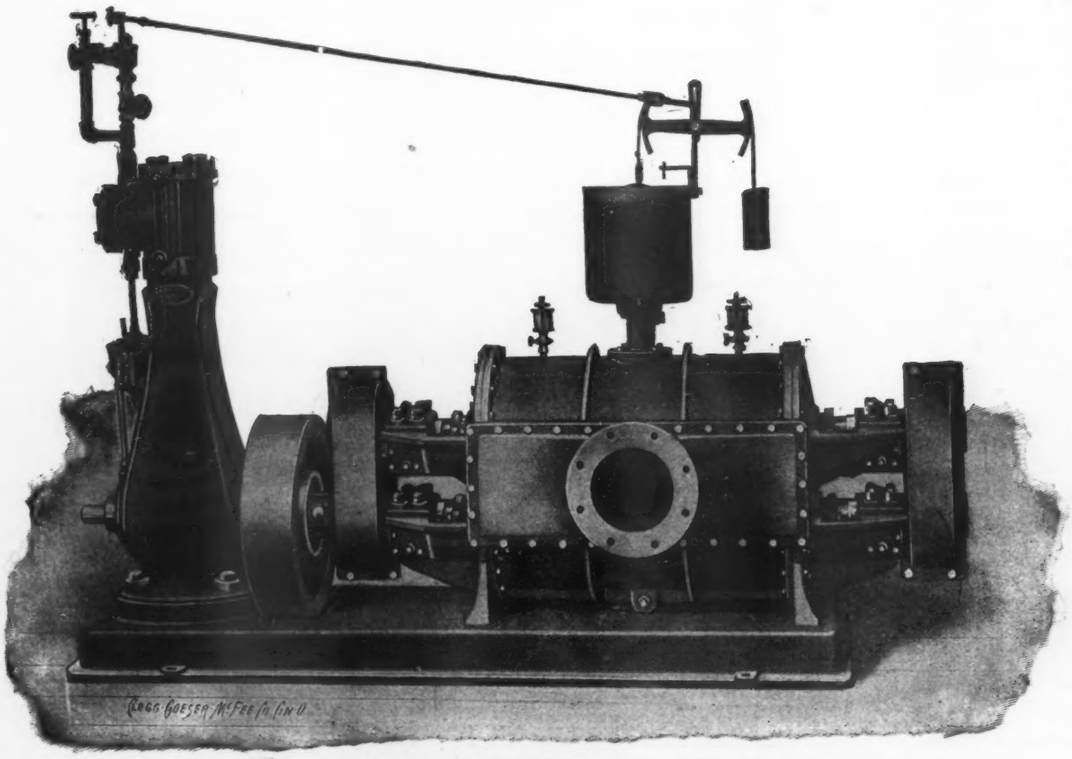

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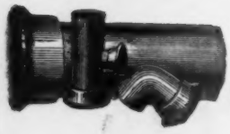

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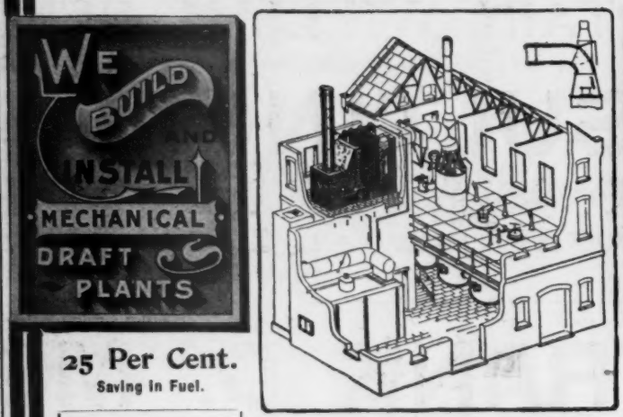

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NEW YORK, ST. LOUIS, PHILADELPHIA, SAN FRANCISCO, CHICAGO,

Photometrical and Experimental Apparatus.

PUBLIC LIGHTING TABLE.

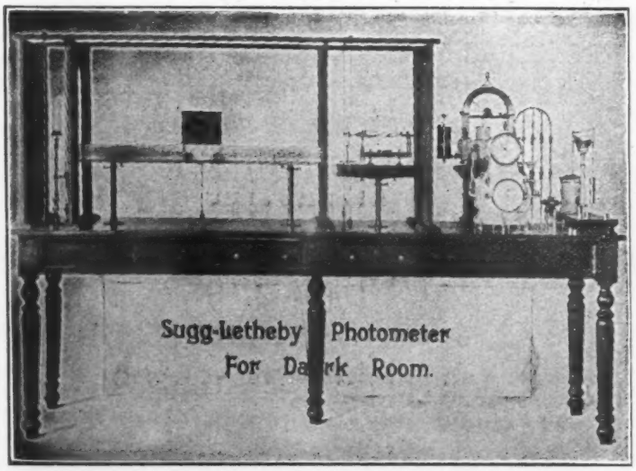
OCTOBER, 1905.

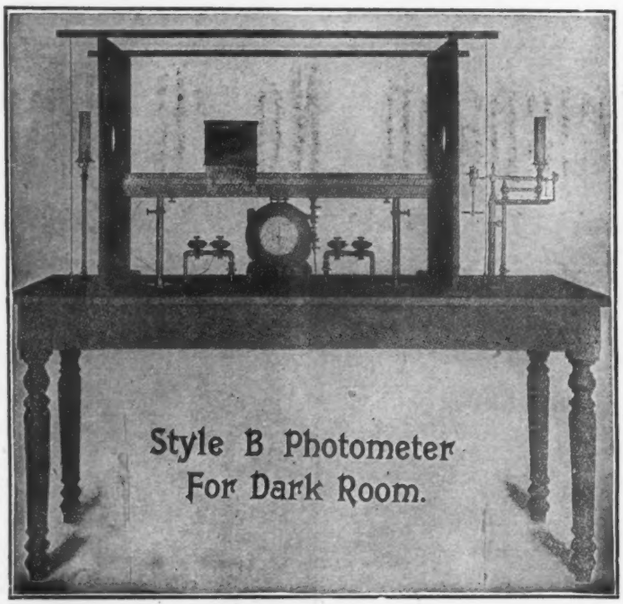
Day of Week.	Date.	Table No. 1. FOLLOWING THE MOON. Light.	Extinguish.
Sun.	1	6.10 PM	5.00 AM
Mon.	2	6.10	5.00
Tue.	3	8.30	5.00
Wed.	4	9 20	5.00
Thu.	5	10.20 FQ	5.00
Fri.	6	11.20	5.00
Sat.	7	12.20 AM	5.00
Sun	8	1.20	5.00
Mon.	9	2.10	5.00
Tue.	10	3.10	5.00
Wed.	11	No L.	No L.
Thu.	12	No L. FM	No L.
Fri.	13	No L.	No L.
Sat.	14	5.50 PM	7.20 PM
Sun.	15	5.50	7.50
Mon.	16	5 50	8.30
Tue.	17	5.50	9.10
Wed.	18	5.50	9.50
Thu.	19	5 50	10.40
Fri.	20	5 50	11.30
Sat.	21	5.50 LQ	12.30 AM
Sun.	22	5.40	1.30
Mon.	23	5.40	2.40
Tue.	24	5.40	5.20
Wed.	25	5.40	5.20
Thu.	26	5.40	5.20
Fri.	27	5.40 NM	5.20
Sat.	28	5.40	5.20
Sun.	29	5.30	5.30
Mon.	30	5.30	5.30
Tue.	31	5.30	5.30

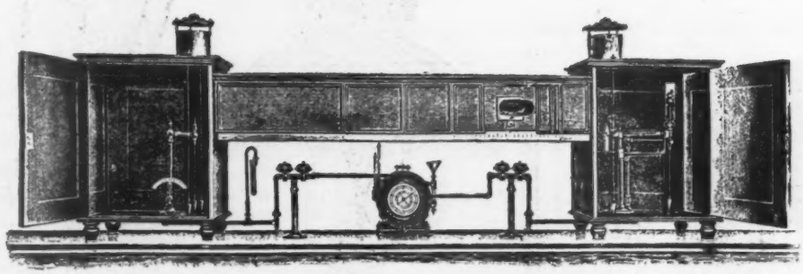
TOTAL HOURS DURING 1905.

By Table No. 1.

	Hrs.Min.
January	240.50
February	192.20
March	207.00
April	175.10
May	161.00
June	139.50
July	149.00
August	161.50
September	173.00
October	205.00
November	211.00
December	229.00
Total, yr.	2245.00







Closed Photometer For Light Room.

CIRCULARS SENT ON REQUEST.

PUBLIC LIGHTING TABLE.

OCTOBER, 1905.

Day of Week.	Date.	Table No. 2. NEW YORK CITY. All Night Lighting. Light.	Extinguish.
		P. M.	A.M.
Sun.	1	5.30	5.00
Mon.	2	5.30	5.00
Tue.	3	5.30	5.00
Wed.	4	5.30	5.00
Thu.	5	5.30	5.00
Fri.	6	5.30	5.00
Sat.	7	5.30	5.00
Sun.	8	5.20	5.10
Mon.	9	5.20	5.10
Tue.	10	5.20	5.10
Wed.	11	5.20	5.10
Thu.	12	5.20	5.10
Fri.	13	5.20	5.10
Sat.	14	5.20	5.10
Sun.	15	5.10	5.20
Mon.	16	5.10	5.20
Tue.	17	5.10	5.20
Wed.	18	5.10	5.20
Thu.	19	5.10	5.20
Fri.	20	5.10	5.20
Sat.	21	5.10	5.20
Sun.	22	5.00	5.30
Mon.	23	5.00	5.30
Tue.	24	5.00	5.30
Wed.	25	5.00	5.30
Thu.	26	5.00	5.30
Fri.	27	5.00	5.30
Sat.	28	5.00	5.30
Sun.	29	4.45	5.35
Mon.	30	4.45	5.35
Tue.	31	4.45	5.35

TOTAL HOURS DURING 1905.

By Table No. 2.

	Hrs.Min.
January	423.20
February	355.25
March	355.35
April	298.50
May	264.50
June	234.25
July	243.45
August	280.25
September	321.15
October	374.30
November	401.40
December	433.45
Total, yr.	3987.45

NEW YORK, 97 Liberty Street. BOSTON, 814 Beacon Building. PHILADELPHIA, Broad and Arch Streets. ST. LOUIS, 712 Roe Building. CHICAGO, Foot of Orleans Street. SAN FRANCISCO, 712 Polk Street.

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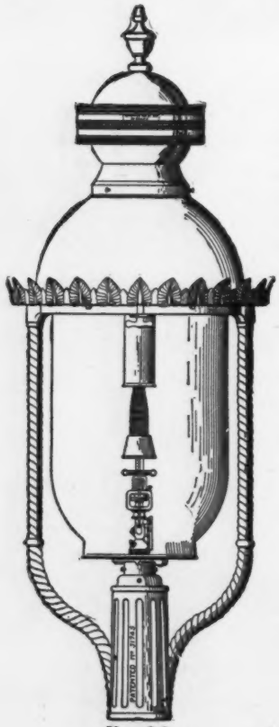
.... OF AMERICA ....



No. 36.

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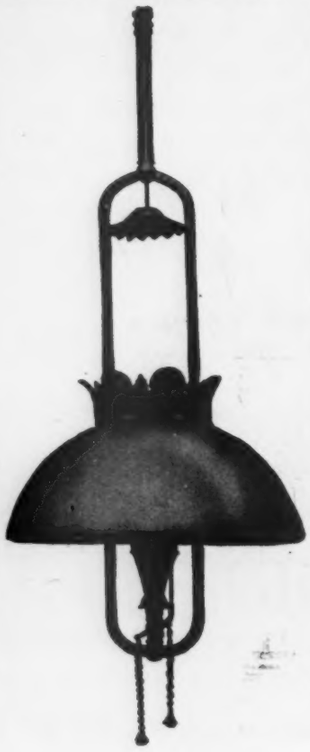

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Pottsville, Pa. (2d contract).	**St. Louis, Mo.** (4th contract).	**Mahanoy City, Pa.**
Evansville, Ind. (2d contract).	**Sioux City, Ia.** (3d contract).	**Nanticoke, Pa.**

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TOTAL DAILY CAPACITY TO JULY 1ST, 1905, . 455,980,000 CU. FT.

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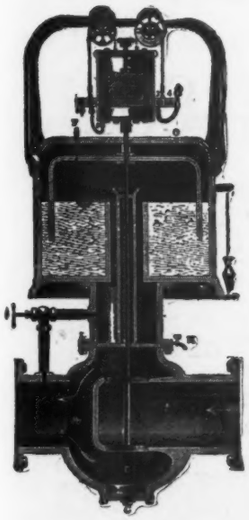

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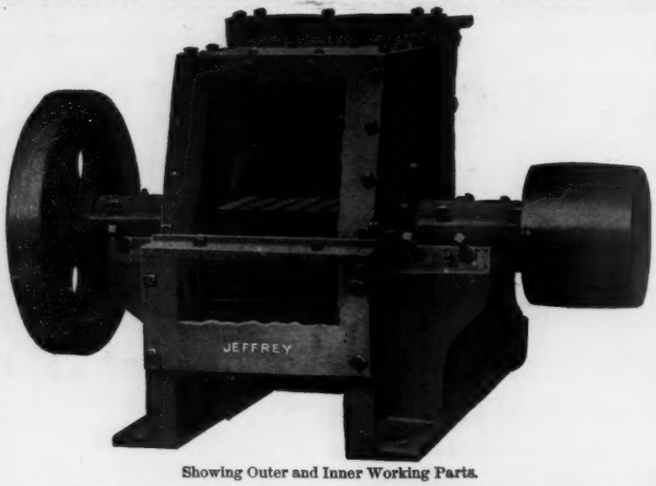

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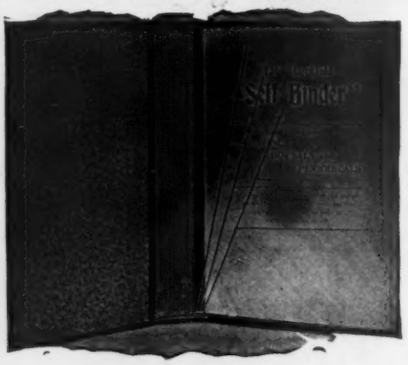

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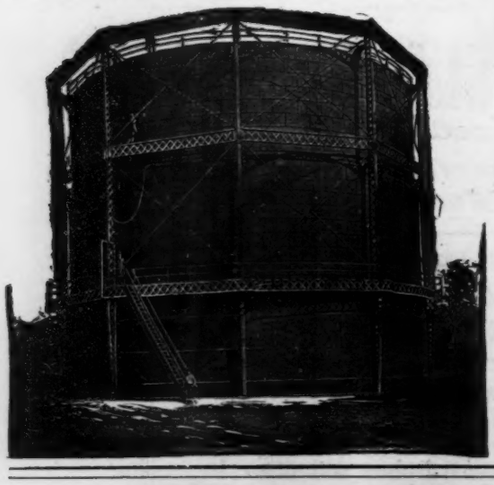

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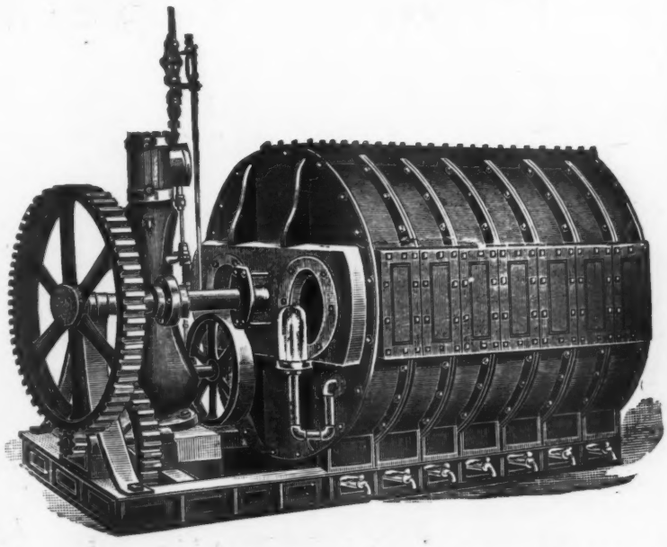

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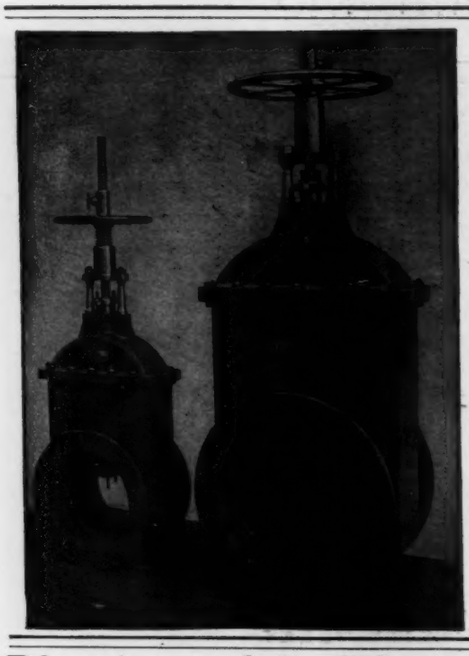

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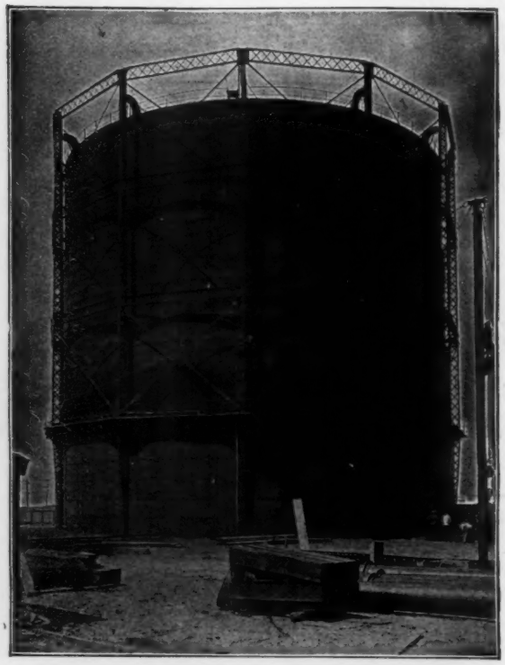

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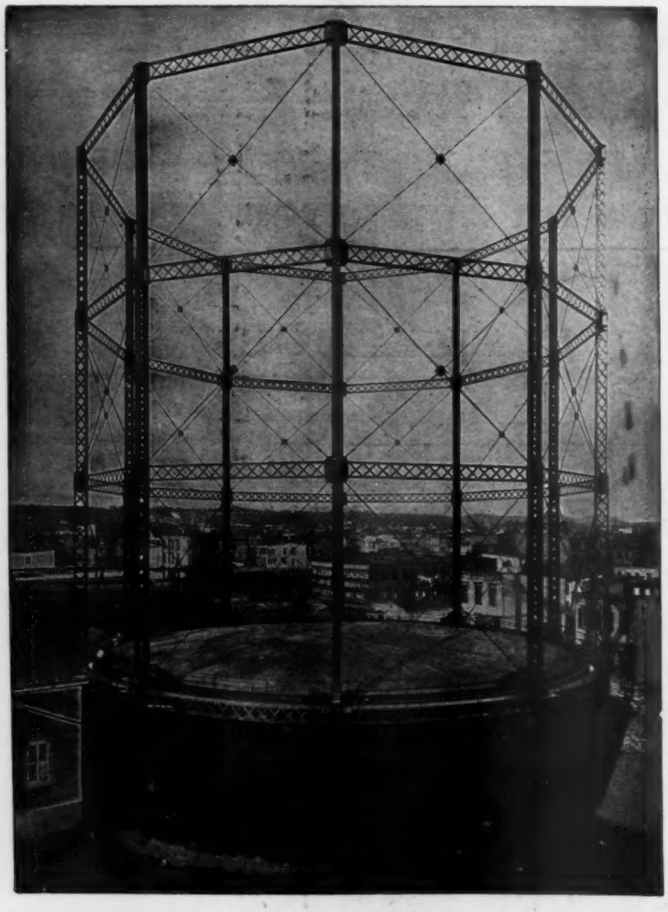

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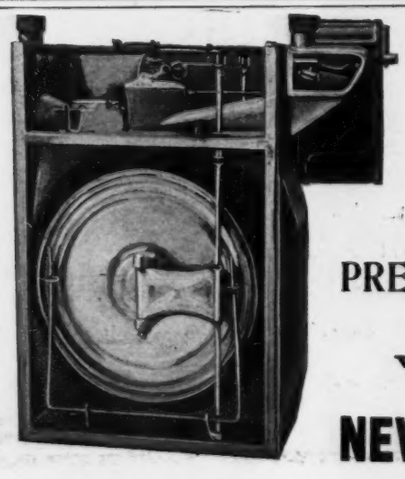

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